NATURE MAGAZINE

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The first edition of 22,000 paper bound books was promptly bought up and the demands of Nature Lovers for a more permanent binding resulted in the substantial cloth Bound Edition.

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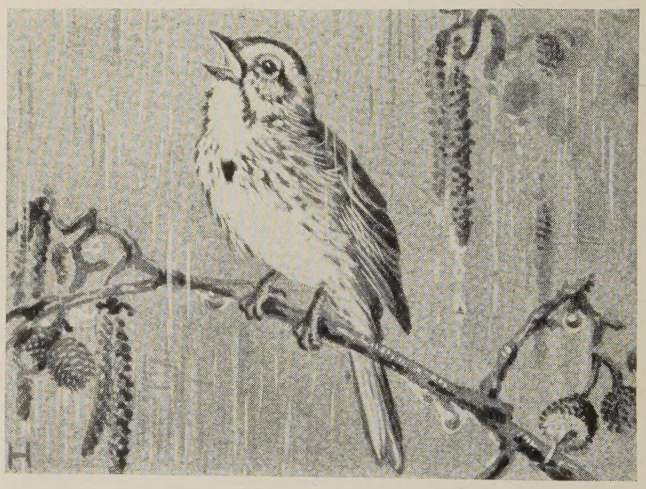

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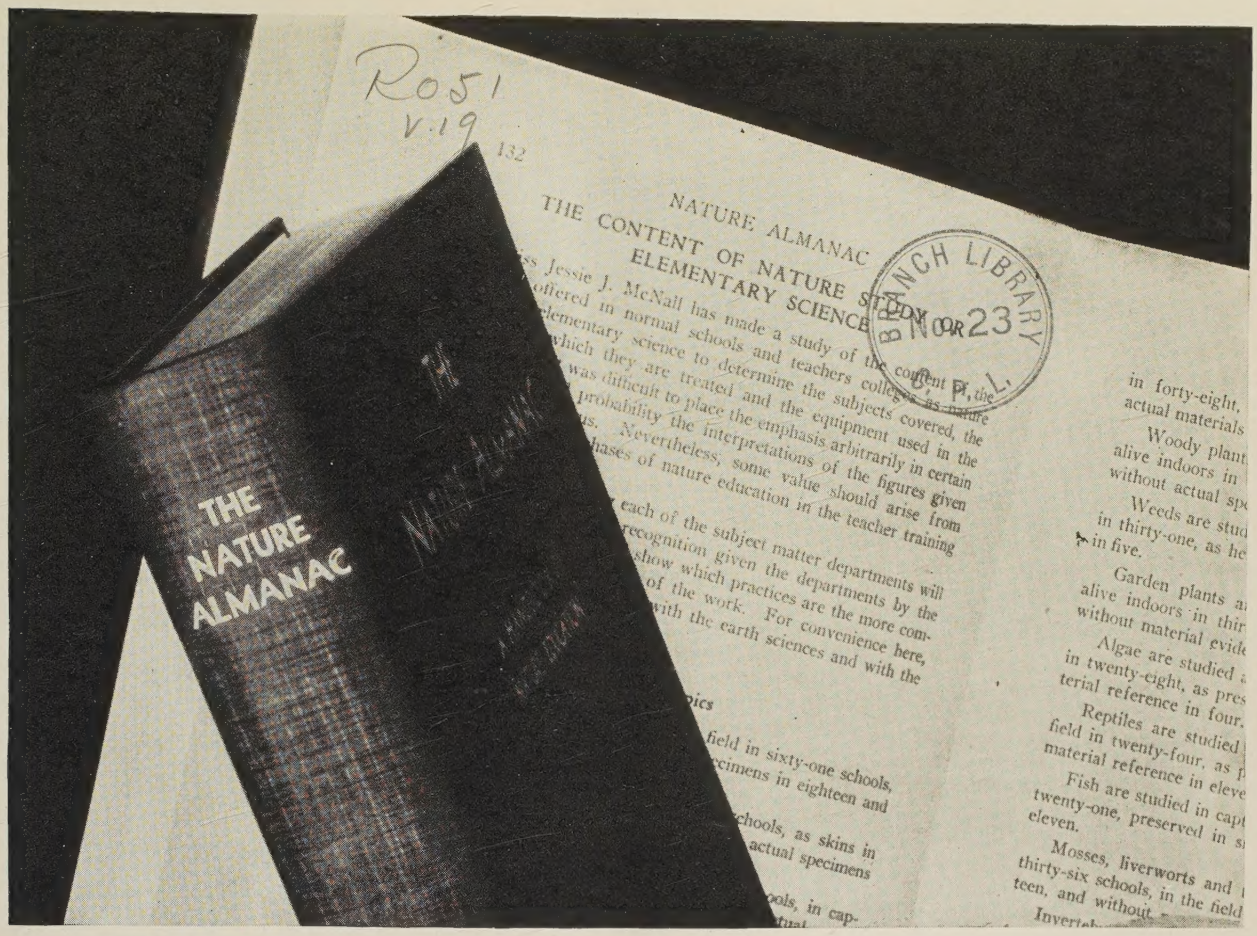

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SHADOWS ADD PICTORIAL QUALITY

Shadows

The importance of shadows should not be overlooked. Pictures consist of light and shade. The beauty of a picture is often dependent as much on the delicacy of its shadows (or again on the contrast between shadow and highlight) as on its composition.

Different types of pictures can be made of one subject—due to changes in lighting. Watch the shadows in a woodland scene or nearby bit of landscape. Observe how they lengthen as the afternoon advances. It is interesting to make a number of pictorial studies of the same subject under varied lighting conditions. Unusually attractive pictures can be made when the shadows from trees have lengthened, by snapping them with the shadows extending *toward* the camera. In such cases, care should be taken that the sun's rays do not strike into the camera lens. As to exposure, it is best to time it for a shadow of medium depth rather than for the brightly lighted parts.

What is "Composition"?

Generally speaking, the "composition" of a picture is simply its arrangement. Some arrangements are made by placing figures or objects. The arrangement is just as truly made by choosing a point of view. You may move a camera a few inches and change the composition.

Again, composition may be affected at the moment when the picture is made. When objects are moving, the instant of "taking" controls the arrangement.

In the case of an outdoor scene, time of day will affect the composition, for light and shadow become part of the arrangement. A good composition at eleven in the morning may be a poor composition at three in the afternoon, for shadows have a form, and light has an emphasis.

Actually the lines do more than make an interesting network.

They lead the eye to the point of special interest.

They must not do this the way the spokes of a wheel lead you to the hub. The eye must not suspect *how* it is being led. But it will like being led.

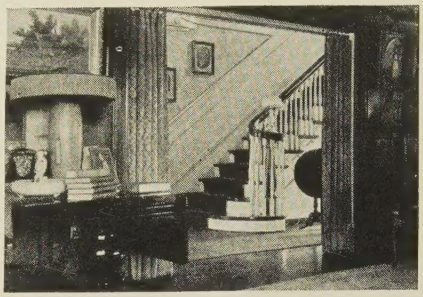
To make clear what I mean by outlines, I have taken a picture and diagrammed its principal lines—those that are most conspicuous to the eye.

If a picture can be diagrammed in this way and the diagram, by itself, is agreeable as to balance, the composition is good.

Balance does not mean sameness. The lines may be full of accident and change, but the general balance, when it is right, gives a satisfaction such as we feel in the irregularity of a tree.

Photographic DEPARTMENT

EDITED BY ROBERT T. LOWELL



MAKE A PICTURE OF YOUR HOME

The Rooms of the Home

Hints on Photographing Them

You will value pictures of the rooms of the home long after they are taken. It is always interesting to look back through the album and see the changes in furnishings and arrangement. Pictures of interiors may be made in the daytime or at night. The manual that came with your camera gives definite exposure directions for daytime pictures. Night-time pictures are also easy to make, but perhaps require a little more experimenting in the matter of exposure.

Here are a few general rules that will aid toward getting good results in either day or night pictures.

The camera must, of course, be placed on a tripod, table, or other rigid support for making the time exposures required.

The camera must be *level,* so that the vertical lines of the walls, as seen in the finder, are parallel with the sides of the finder.

More of the floor than of the ceiling must be shown, or the room will appear to be top-heavy.

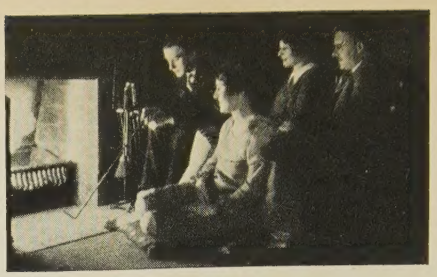
Before making the exposure, place your head squarely in front of the lens and look for reflections in pictures or mirrors and, if any are seen, place a wad of paper behind one corner of the frame, thus changing its angle.

Never place large pieces of furniture in the foreground.

What is "Composition"?—Cont'd

It is to be remembered also that the outer edge of a picture is part of its composition. The "holes" or open spaces inside the margin should have variety of shape. Lines should disappear into the margin at agreeably varied points. When they do this best, the diagram may be turned upside down and still seem agreeable in itself. Thus a good composition may be guessed at long range before you know what the picture is about.

Can good composition come by accident? Sometimes. It may *happen* because all of our ideas of beauty come from the natural.



FIRESIDE FASCINATION

Hearthfire Pictures

There is many a picture chance around the home during the bleak winter months, and night-time presents special opportunities.

If you have never tried a fireside picture, you will find a great fascination in such photography. A little care and study as to best grouping will be necessary and will test your ingenuity.

The best way to make the picture is by flashlight, using a Photoflash Lamp which can be secured at any camera store and will also be found in electrical supply stores. Complete details of the Photoflash Lamp will be sent on request.

When making the picture with the subjects grouped about on the floor and in chairs, do not place the camera in too high a position. When all is in readiness, set the shutter for "time" exposures, open it, make the flash, and immediately press the lever to close the shutter—and don't forget to immediately turn the film to the next number.

"Depth of Focus"

There are perhaps a number of terms in photographic parlance which the average camera user does not understand.

Depth, or depth of focus, is one. A picture which is said to have "good depth of focus" is one in which objects at various distances from the camera appear sharp and well defined in the print. This range of definition is controlled by the aperture or opening used in the lens.

While the larger opening in the lens admits a greater volume of light to the sensitive film, it means a consequent loss of sharpness in some part of the picture. At times—under adverse light conditions and when the action of the subject demands a rapid shutter speed—a larger lens opening is a necessity.

However, when light conditions permit, it is generally best to use the smaller openings and thereby gain in depth of focus, except in the matter of portraits when soft lines are desirable and background objects are not too sharp to be obtrusive.

The smaller stop openings will take care of considerable error in estimating distances and focusing the camera incorrectly.

The picture of the interior is a good example of what may be secured with a small stop opening.

The little manual of directions that is furnished with each camera tells what can be accomplished with the lens equipment it carries and it also contains a depth of focus table which is of interest.

The sharper the negative, the greater the size of enlargement that may be made from it.

THE CAMERA
WITH TWO SIZES IN ONE
Voigtländer
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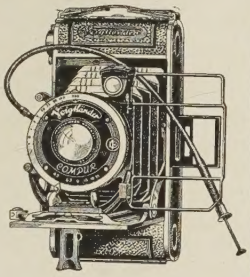
The first folding model roll film Camera of its kind. It takes twelve 1⅝ x 2½ or six 2¼ x 3¼ pictures



It's fitted with F4.5 Skopar Lens in Compur Shutter. Takes standard No. 120 film.

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The finders are adjustable for either size.

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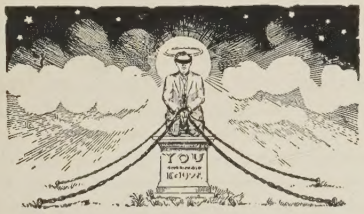

ARE YOU AN ENSLAVED GOD?

Are all the world's benefits just beyond your reach? Are you held fast to one position in life, one line of work, one narrow margin of income? Is the great cry of the "SELF WITHIN" for freedom and personal power, choked into stillness by your limitations?

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Come, lay your biases, doubt, and hesitancy aside! Learn the truth of your possibilities as soon as you free the inner self from its prison. The Rosicrucians will send you a fascinating book called the "Light of Egypt." It will show you how to learn to OVERTHROW OBSTACLES in life and COMMAND A REALIZATION OF YOUR DESIRES.

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Nature Magazine's Cruises to Southern Seas

By RICHARD W. WESTWOOD
Director of Field Trips

At least one and perhaps two parties made up of the readers of NATURE MAGAZINE will sail for Caribbean ports within the next two months. On January 23 the Cunard Line's *S. S. California* will steam out of New York bound for an eighteen-day ramble under summer suns to exotic ports of the West Indies and Central America. Then, on February 27, the *S. S. Scythia* will depart for twenty-three glorious days to even a greater number of interesting ports.

Certainly on the *Scythia* and, quite probably, also on the *California,* there will be a small group of congenial folks travelling with the NATURE MAGAZINE party. Both of the groups will be limited to twenty-five in order that the comradeship which so distinguished the cruise of last year may be perpetuated this year. The party on the eighteen-day cruise will be led by Mr. P. S. Ridsdale, Managing Editor of NATURE MAGAZINE, and Mrs. Ridsdale. The party on the twenty-three-day cruise will be led by Mr. Tom Gill, forester of the Charles Lathrop Pack Forestry Trust, specialist in the Tropics and well known author. Mr. Arthur Newton Pack, president of the American Nature Association, together with Mrs. Pack, plan to accompany the party on the *Scythia.*

Both of the ships used for the cruises are Cunarders equipped for voyaging in West Indian waters. A group of cabins of medium price has been set aside for the NATURE MAGAZINE parties, although it is possible to obtain less expensive or more expensive accommodations. However, we recommend accommodations of about the character we have reserved in order that the members of the party may get the fullest enjoyment from the trip.

All expenses for these cruises are covered by the prices quoted by the Field Trip Department of NATURE MAGAZINE. These prices vary, of course, with the character of cabin selected, but they cover shore trips, meals ashore, deckchairs, steamer rugs, all tips except those of personal character connected with services rendered by the personnel of the ship—in fact, everything except the amount one may elect to spend for personal reasons. The leaders of the trips take all bothersome details off the hands of the members of the parties and the cruise is one of utter relaxation.

There is no need to dwell on the facilities of the *Scythia* and the *California,* or the charm of winter travel under summer suns. The first are described in literature we will have sent to those interested; the latter means using a lot of superlatives in which we will not indulge.

The shore trips, however, are an out-

(Continued on page 5)

BOOK NOW!

FOR THE

NATURE MAGAZINE WEST INDIES CRUISES

Give yourself a glorious change of scenery and climate in 18 pleasure-packed days aboard the luxurious *California,* sailing on January 23; or aboard the *Scythia,* sailing on February 27 for a 23 day cruise.

Again Nature Magazine parties have been arranged, and will be strictly limited as to members. Mr. Tom Gill, former Chief of the Public Relations Division of the United States Forest Service, who is well acquainted with both individuals and locations in the Caribbean region, will be in charge. These two cruises are travel events of supreme importance . . . with visits to most worthwhile Caribbean ports.

For further information about the Nature Magazine Cruises write to the Director of Field Trips, Nature Magazine, 1214 16th Street, N. W., Washington, D. C.

Other Cunard West Indies Cruises of 4, 12, 15, 18, 23 days sail up to April 1932. Greatly improved accommodations . . . a vast variety of itineraries.

Carry your funds in Cunard Travellers' Cheques
The Cunard Steam Ship Co., Ltd., 25 B'way, N.Y.

CUNARD

Educational Series

An interesting literary project is that undertaken by the University Society, Inc., in its projected group of forty titles under the general head of "High Lights of Modern Knowledge." The first four titles in this series have just reached us, being *The Animal World,* by Dr. James George Needham; *Stars and Planets,* by Dr. Donald H. Menzel; *The Earth,* by Dr. Chester A. Reeds, and *The Plant World,* by Dr. C. Stuart Gager. The fundamental idea of the series is to provide the busy person with concise, authentic and basic information on the forty different subjects to be covered in the plan. These first four books are designed to give fundamental information in the fields of Zoology, Astronomy, Geology and Botany. The books take the form of approximately 120-page books bound in heavy paper, well illustrated and presented with semi-scientific treatment. The books sell for seventy-five cents each or the set of four reviewed here for three dollars. Readers interested in these or the other titles to come may obtain all information from The University Society, Inc., 468 Fourth Avenue, New York City.

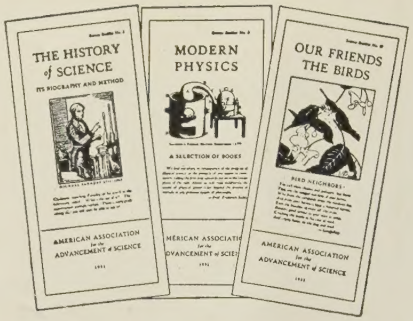
Garden Pictorial

Two beautiful books for those interested in the garden from the pictorial and architectural point of view have just come to us from the presses of the Macmillan Company. *California Gardens* contains 208 large-size plates of gardens in California arranged by Winifred Starr Dobyns to illustrate special landscape features and elements of design. The interest in this volume is not local because the photographic suggestions that it contains are of general application. It is, besides being of interest to gardener and landscape architect, attractive to anyone who loves beautiful books. It is listed at five dollars. In *Chinese Garden Architecture* we have another lovely book not dissimilar to the California volume because it applies the same treatment to the gardens of the Chinese. It is the work of Edwin L. Howard, who took the photographs in company with E. V. Meeks, Dean of the Yale University School of Fine Arts. Dean Meeks supplies an interesting foreword. This book is listed at six dollars.

A Beautiful Book

A Bird-Painter's Sketch Book is the most beautiful bird book we have ever seen. It is written and illustrated by Philip Rickman, British artist, and it has been printed with a taste and attention to detail that sets off the text and the illustrations to their utmost possibilities. The book is what the title suggests and is not a handbook to use for bird study. Rather is it a lovely volume that will grace any library and give joy to any lover of the outdoors. Thirty-three different birds are described in the entertainingly written text, and thirty-four birds are represented in the illustrations, eleven of these being beautifully executed and perfectly reproduced color plates. Some of the black and white reproductions are of sketches in pencil and others of completed pictures. Both are delightful. The volume was printed in England by Eyre and Spottiswoode, Ltd., and does them great credit. It is published in this country by Charles Scribner's Sons and sells for ten dollars.

NATURE IN PRINT


THE HISTORY of SCIENCE
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MODERN PHYSICS
A SELECTION OF BOOKS
OUR FRIENDS THE BIRDS
BIRD NEIGHBORS
AMERICAN ASSOCIATION for the ADVANCEMENT of SCIENCE

Valuable Book Lists

Probably popular books on science have never had such a thorough going-over as that given them during the last two years by a special committee of the American Association for the Advancement of Science. As a result, there are now available, from the Association Headquarters, Smithsonian Institution Building, Washington, D. C., a series of twenty-six book lists on the following scientific subjects: 1. General Science; 2. History and Biography of Science; 3. Exploring for Science; 4. Mathematics; 5. Astronomy; 6. Geology, Minerals, Geography; 7. Wind and Weather; 8. Physics; 9. Chemistry; 10 and 12. Microbes and Microscope; 11. Biology; 13. Botany; 14. Wild Flowers; 15. Ferns, Mosses and Fungi; 16. Trees and Shrubs; 17. Zoology; 18. Animals; 19. Birds; 20. Insects; 21. Sea and Shore; 22. Inland Waters; 23. Fishes and Reptiles; 24. Paleontology; 25. Evolution and Heredity; 26. Anthropology and Ethnology; 27. Teaching of Science.

Each list is printed in a folder briefly describing anywhere from ten to twenty-five of the most outstanding books for the general public and the amateur scientist. Altogether, more than six hundred and fifty books are recommended, the most helpful ones being starred.

More than two thousand books were carefully evaluated by the committee, aided by some four hundred scientific specialists, librarians, and others interested, and the lists are a real contribution to popular interest in science, both the physical and biological sciences being represented.

Thanks to a grant from the Carnegie Corporation for the printing of the lists after the selection was completed, the lists are distributed free in quantities to public and college libraries and museums, from which they will be distributed to the public. A single list may be obtained by sending 5c in stamps to the Association for a single list or 30c in stamps for one complete set of the lists, to cover postage and mailing.

Practical Zoology

In the field of textbooks we have recently received a copy of a new and revised edition of Robert W. Hegner's *Practical Zoology,* first published in 1915. The revision recognizes the marked advances in the field of zoology during the past decade as well as the changes that have taken place in the work of conserving various forms of our wild life. The author has gone over his original volume, editing in the hope that the book may not only convey knowledge but that it may inspire in the rising citizen a desire to preserve wild life and not destroy. The new edition, as was the original, is published by the Macmillan Company; it is listed at $1.80.

A Snake Book

We are delighted to see this book—*Snakes of the World* by Raymond L. Ditmars. Many have been the requests that have come to NATURE MAGAZINE for suggestion of a good work on snakes and have found us at a disadvantage. We have been forced to suggest that the inquirers search the bookshops for Dr. Ditmars' *Reptiles of the World* and other general works. At last the Macmillan Company has let us out of our difficulty through the publication of this last volume. There is no need to introduce its eminent author or to comment that the book is authentic and valuable. All that goes without the saying. Here, then, is the book that those interested in snakes have been seeking. It contains, in addition to the thorough text, eighty-four plates illustrating the most interesting and most significant ophidians. The volume sells for six dollars.

Identifying Trees

To the average student of Natuie, trees in winter present serious difficulties in identification. Those species easily recognizable in summer seem much different without their leaves and against a bare background. A book recently reissued in abridged form by Macmillan is designed especially to bridge this gap in the Nature-lover's knowledge, and to supply the means for many interesting winter trips to the woods. It is *Trees in Winter,* by Albert Francis Blakeslee and Chester Deacon Jarvis, and was first issued in 1913 as a standard scientific work, with complete identification keys, descriptions and photographs. The new edition includes only the material on tree study and identification, but makes a complete handbook of convenient size which will satisfy both the casual student and the scientific-minded individual who likes to probe deeply. The book is priced at $2.

Holiday Hill

Edith M. Patch, frequent contributor to NATURE MAGAZINE and author of several children's books, has brought out another of her delightful Nature volumes that have the knack of combining the entertaining with the informative without losing in either accuracy or interest. The title of the new book is *Holiday Hill,* which suggests the subject-matter—the common plants, animals, birds and insects to be found on any hill. In plainly phrased language any child can understand, she tells about Old Boulder, the remnant of the Ice Age; Chickaree the squirrel, born in Arbor Vitae Camp; the night-blooming flowers and night-roving insects; Chlamys the beetle; Sir Talis the garter snake; the elms and other of the neighbors that live and grow together on Holiday Hill. The charming text is supplemented by equally charming pictures and the whole is most attractively printed by Macmillan. The price is $2.

TRAVEL DEPARTMENT

(Continued from page 3)

standing part of the NATURE MAGAZINE cruises. Utilizing Mr. Gill's intimate knowledge of what to do and how to do it in these ports of call, we have arranged a special group of trips ashore. These are available only to the members of our parties and they cover not only the things of usual interest but those of unusual character. Let's briefly outline the shore program for the two cruises.

"CALIFORNIA" CRUISE

The first port of call will be San Juan, Porto Rico, where the ship will be in port for an entire day. After breakfast the party will find private cars waiting to drive them through the interesting part of the city out to the Forestry Station at Rio Piedras and thence to the fascinating Pennock's Gardens. Returning by way of the Carolina-Louisa Road, the party will have luncheon at the Union Club and for those who bring their own suits there will be a dip in the Union Club pool. After luncheon there will be a drive around the head of San Juan Bay and across the mountains to Caguas, through a region of fruit, tobacco and coffee plantations. The return to town and the ship will be over the military road by way of La Muda and Guaynabo.

The two next ports of call are St. Thomas, Virgin Islands, and Santo Domingo. At neither of these ports is there any special program planned because the interest is inherent in the communities themselves and the members of the party will wish to take a leisurely look around.

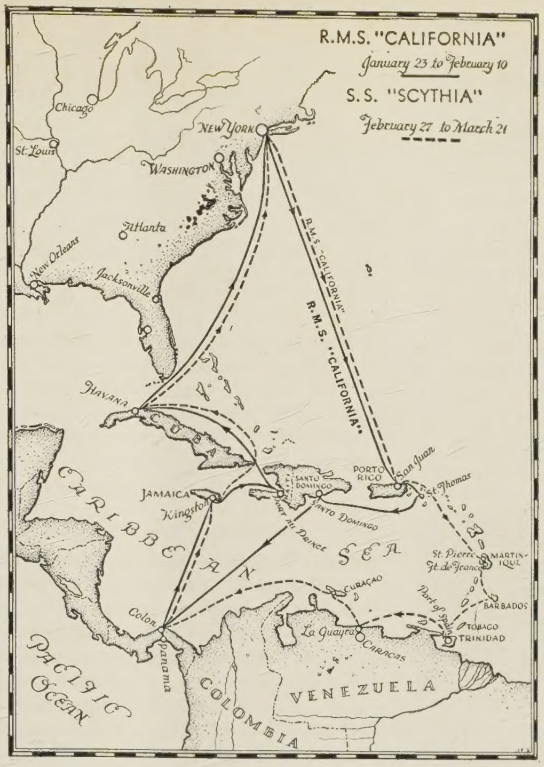
From Santo Domingo the *California* moves on to Colon, Canal Zone. Early in the morning the party will take the regular transisthmian train for Summit, there to visit the interesting Plant Introduction Gardens under the guidance of the director. Then on to the Pedro Miguel Locks, from which they go by private car to Panama City where, after a drive through the American city and the fascinating old section, there will be a luncheon at the Miramar Club. The party will then return to the Atlantic side in time for the departure of the ship.

From Colon the ship moves on to Kingston, Jamaica, where our party will leave by private automobile for Spanish Town and Bogwalk, reaching the Manor House at Constant Spring for luncheon. After luncheon the group will visit the Castleton Gardens, which should not be missed, before returning to the ship.

Next comes Port-au-Prince, Haiti. There motor cars will be waiting on the dock to whisk the party through the business section of the city to Bizoton and thence to the rubber experimental farm. After an interesting visit the party will return to the city and visit the Champ de Mars, the Residential Palace, and then drive out to Petionville, a typical native village on the mountainside, from which one gets a magnificent view of Port-au-Prince and the harbor. Thence back to town for such shopping as one may wish to do.

Last but not least is Havana. With a day and one-half to visit this fascinating city,

(Continued on page 7)



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The twenty-three day cruise leaving New York February 27 is indicated by the dotted line on the map.

The eighteen-day cruise leaving January 23 is only tentatively scheduled and depends upon interest shown.

• • •

A WINTER TRIP THAT IS DIFFERENT

"What I wanted was a winter vacation with a congenial group," said one of the members of last winter's Nature Magazine Caribbean Cruise. "And I certainly found it."

Others have the same opportunity this year. . . A twenty-three day cruise on the truly luxurious S. S. SCYTHIA, calling at the most fascinating Caribbean ports . . . Specially-arranged shore trips exclusive to our group . . . Party strictly limited to twenty-five . . . Conducted by a member of our staff intimately versed in the Tropics . . . Excellent medium-priced accommodations forward on C-Deck held for our party . . . Every detail on ship and ashore cared for, even to deck chairs and dining room seating . . . A winter holiday that is an assured success before you start.

All-expense cost about $450 for good, comfortable accommodations . . . Less expensive accommodations available if desired.

Palm Beach Suits in March?...Why Not?

For further information about the Nature Magazine Cruise write to the Director of Field Trips, Nature Magazine, 1214 16th Street, N. W., Washington, D. C.

Writing

a source of income that many people neglect

MANY people who *should* be writing never even try it because they just can't picture themselves making "big money." They are so awe-struck by the fabulous stories about millionaire authors that they overlook the fact that $25, $50 and $100 or more can often be earned for material that takes little time to write—stories, articles on home or business management, sports, travels, recipes, etc.—things that can be easily and naturally written, in spare time.

Mrs. Cherry Bomer Smith, 2315 Cherry St., Vicksburg, Miss., is but one of many men and women trained by the Newspaper Institute of America to make their gift for writing pay prompt dividends. She writes:

"I have enjoyed the course very much indeed and wish to report that I just sold a feature article for $40.00 to the Hearst newspapers' Sunday Supplement—the American Weekly Magazine."

Another of our student-members who tried is Arthur S. Pettit, 3683¼ So. Burlington Ave., Los Angeles, Cal. He writes:

"Since enrolling with the N. I. A. I have written several articles for health publications that have been accepted. I am now engaged in the preparation of some articles on church music and on business. Again I want to assure you that I am well satisfied that I decided to learn to write by your copy-desk method."

You, too, can learn to write! How? By WRITING!

The Newspaper Institute of America offers an intimate course in practical writing—a course as free from academic "isms" and "ologies" as a newspaper office—a course as *modern* as the latest edition of this morning's paper.

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NATURE NEWS and VIEWS

Better Outdoor Manners

The American people, especially the younger generation, are rapidly learning their outdoor manners, although much room for improvement still remains, according to Mrs. Francis E. Whitley, Iowa Chairman of the Garden Club of America. The movement against roadside disfiguration and tree and flower destruction has spread from state to state, she asserts, and many organizations are now throwing their influence against careless traveling habits and vandalism. Taking part in the drive for outdoor good manners have been the American Nature Association, the Garden Club of America, the General Federation of Women's Clubs, the Wild Flower Preservation Society and its branch groups, the Boy Scouts, Girl Scouts and Camp Fire Girls. In many states manuals for Arbor Day or Forestry Week exercises contain suggestions for Nature study and the teaching of protection of birds and wild flowers, and the Iowa handbook, issued by the Department of Public Instruction, devotes an entire chapter to outdoor manners suggestions for teachers. In the comprehensive program for Nature study and conservation education issued by the Conservation Council of Pennsylvania, it is proposed that "organizations having as their aims the development, enjoyment and conservation of our natural resources be urged to impress upon all their members strict compliance with the law and the development of outdoor good manners" as one of the best ways of educating the general public.

A play showing good and bad manners out-of-doors was put on before a convention of Oklahoma women's clubs as a part of the general education program, and in Iowa and Pennsylvania poster contests similarly stimulated public interest. Placards setting forth the principles of outdoor manners have been posted in school-houses, libraries and filling stations, and on screens in moving picture houses all over the land, and numerous broadcasts on the subject have been made. Many of the finest cartoonists have lent their aid to the campaign, Mrs. Whitley reports. Many states are making conservation education a part of the school curriculum, among them Massachusetts, Connecticut, Maine, California, Iowa, Alabama and Texas. An interesting reaction to the drive has come from Australia, where the secretary of the Canterbury District Horticultural Society has written for additional copies of the Good-Manners literature issued by the New England Wild Flower Preservation Society for students and Nature-lovers in his country.

Mrs. Whitley admits that "vandals still infest our loveliest woodland nooks, the billboards still obscure the fairest scenes and the heathen apparently continues to rage." But she points out that "the children are learning better things and they call to us, 'Have courage! We are growing up.'"

Finley Lectures

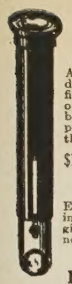
Many of our readers have asked to be kept informed of the lecture schedule in the East of William L. Finley, our field photographer and naturalist, whose wild life travels with Arthur Newton Pack, President of the American Nature Association, have resulted in such remarkable motion pictures and such interesting stories for NATURE MAGAZINE. Here are some of Mr. Finley's dates during December and January: December 15, Beacon, N. Y., Board of Education Series; December 17, New York City, American Museum of Natural History; December 20, Lawrence, Mass., White Lecture Fund; December 21, Groton, Mass., Groton School; January 10, Coatesville, Pa., Y. M. C. A.; January 12, Lancaster, Pa., Lancaster Travel Club; January 14, Pittsburgh, Pa., Science and Art Museum; January 15, Reading, Pa., Reading Public Museum; January 18, Bronxville, N. Y., Parent Teachers Association; January 19, Poughkeepsie, N. Y., Vassar Brothers; January 20, Cortland, N. Y., State Normal School; January 23, Windsor, Conn., Loomis Institute; January 25, Kingston, Mass., Adams Course.

To Measure Glaciers

Lyell Glacier, largest ice body in the California Sierra, has never been measured for its flow. C. A. Harwell, Park Naturalist of Yosemite, is going to remedy that and will climb the 13,090 feet of Mt. Lyell, the highest peak in the park, to mark the position of the glacier on the mountain. The measuring of the glaciers in the National Parks is being undertaken at the request of Francois E. Matthes of the United States Geological Survey. Mr. Harwell will record the present "front" of each lobe of the Lyell Glacier, and also of the McClure Glacier, by permanent paint marks on aligned rocks, each far enough out from the ice mass so that the glacier will never obliterate it. Each subsequent autumn the recession or advance of the ice will again be noted. The same system will be applied to living glaciers in Mt. Rainier, Glacier and Rocky Mountain National Parks.

Flying Yellowstone Falls

Both dudes and ranger-naturalists in Yellowstone have had no little entertainment watching the raven and the osprey fly the Yellowstone River above the Lower Falls, and speculation has arisen from the nature of their flight as to whether Poe's bird is cowardly and the fisherman merely reckless. The raven wings his way back and forth across the canyon until he has attained an altitude considerably above the water as it tumbles over the crest of the Lower Falls. Not satisfied with sixty or seventy feet of space between him and the plunging waters, writes Dean T. Cornwall in Yellowstone *Nature Notes*, he hugs the canyon wall. The osprey, however, takes no such plodding way. He begins with a downward glide that turns into a powerful upward swoop, and he rides some air current that carries him rapidly higher and higher. A few flaps of his strong wings, and he has swept over the very center of the crest of the falls with just a few feet to spare—neither time nor distance is wasted. It must make the more cautious raven dizzy to see such a seemingly foolhardy risk of life.



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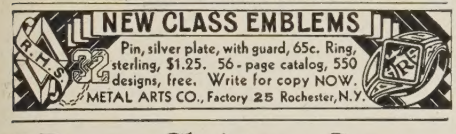
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TRAVEL DEPARTMENT

(Continued from page 5)

the members of the party will spend the afternoon of arrival on a city and suburban drive about Havana, giving them a complete picture and an opportunity to make up their minds what they want to do in the evening. The evening will be unplanned so far as the party as a whole is concerned, but the next morning a trip will be made to Morro Castle. The afternoon is left open for individual action, particularly since this is the last port and many will undoubtedly wish to visit the shopping district.

That night the *California* turns her prow northward after a well-rounded and fascinating trip.

"SCYTHIA" CRUISE

As with the *California,* the first port of call on this trip will be San Juan, and the same shore program has been arranged.

The next port is St. Pierre, Martinique, where the party will visit the ruins caused by the eruption of Mt. Pelée in 1902, and then continue on across the island to Fort de France, the capital of Martinique. This is the birthplace of Josephine, Empress of France, and a picturesque spot. There the *Scythia* will be awaiting the arrival of the party.

Next comes Barbadoes. After breakfast the party will leave by private cars for Turner's Hall Wood, an interesting remnant of tropical forest, passing through a section full of fascination. Then on to Marine Hotel for luncheon. From there cars will take the party to the Aquatic Club for swimming and leisure until time to return to the ship by private launch.

On to Brighton where the party will go ashore for a drive to Pitch Lake and a visit to the factory there, thence through the East Indian and native villages of San Fernando and Williamsville Station to Tortuga Church, where a pause will be made to see its black Virgin. The drive will continue through the villages of St. Joseph and San Juan and across the beautiful scenic drive of the Saddle Back to the Botanical Gardens. Then on to the Queen's Park Hotel in Port of Spain for luncheon. There the boat will meet the party again.

A treat awaits at the next port, La Guaira, Venezuela. From the port the party will take one of the most wonderful mountain drives in the world, across the Andes to Caracas, the capital of Venezuela. There, there will be a luncheon specially arranged at one of the city's fascinating cafés where the native food of the country will be enjoyed. The afternoon may be spent in poking about or on a drive around the interesting parts of the city.

There will be no special shore trip planned for Curacao, although the party may be relied upon to figure out various ingenious ways of spending its time at this port. The shore trips at Colon, Kingston and Havana will be the same as those arranged for the *California* party.

So that is the story of the NATURE MAGAZINE Caribbean cruises. It is unadorned by adjectives, but we will leave it to those fortunate enough to be members of one or another of the parties to supply the superlatives after the trip.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

CONTENTS FOR JANUARY · 1932

Photographic Department....Robert T. Lowell 2
Jungle Orphan.....Tom Gill 11
More Winning Pictures..... 16
The "Master Word".....Dallas Lore Sharp 18
Which Way's the Wind? Charles Fitzhugh Talman 21
My First Water Ouzel.....Ellen Howard Miller 25
Lamps That Insects Light....Louis E. Reichard 26
When Is a Toad Not a Toad? Doris M. Cochran 28
Tegwane, Bird of Evil Omen Raymond B. Cowles 29
Birds in Color.....R. Bruce Horsfall 33
John Ray; Bird Carver.....Marie Pilkington 37
Where Fat Aided.....R. F. Carey 38
Bamboo .....Jeanette Speiden 39
Beavers Twenty Miles from B'Way Hiram Blauvelt 42
Florida's Geological Past.....Herman Gunter 43
Whittier's Tree.....Edward A. Preble 48
Lost? Strayed? Stolen?.....Ethel I. Mason 49
The Shy Orchids.....S. S. Dickey 52
January Wears the Garnet..August Pondorf, Jr. 53
Trees for Washington....Charles Lathrop Pack 54
Total Solar Eclipse.....Isabel M. Lewis 56
Index to Advertisers..... 68

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SANCTUARIES FOR BROWN BEARS

An Editorial

One by one our large mammals are threatened with extinction from persecution in the name of sport, or from commercialized exploitation. Everywhere there are people who for one reason or another have the will and the power to destroy. The grizzly bear, one of the most distinctive of America's wild animals, has long been extinct in most of our states. Only a few now remain alive, mainly in the protection of the National Parks. Now comes the realization that the great bears of Alaska—brown bears and grizzlies—are in dire need of protection.

Sanctuaries of adequate size, so situated as to serve the more interesting forms of the various types, seem to be the only solution to a problem that has aroused to earnest effort a number of interested individuals and organizations, especially the American Society of Mammalogists, and the New York Zoological Society. It seems fitting that the American Nature Association, which exists mainly to work for the preservation of our threatened wild life resources, should lend its influence to this worthy effort. It was this decision that largely motivated the Pack-Finley expedition to southern Alaska in the summer of 1931, an account of which will appear in next month's issue of Nature Magazine. Another camera hunter, John M. Holzworth, has spent several seasons with Alaska's large bears, also on Admiralty Island, and has published in book form an able defence of the brown bear, based largely on his own close associations with the animal.

The wild life of Alaska is under the administration of the Alaska Game Commission, composed of a member from each of the four judicial divisions and a representative of the Biological Survey. Under its regulations the large bears, though classed as game animals, enjoy at the hands of residents no close season and no bag limits, excepting in the three areas classed as National Parks or National Monuments, and in certain other restricted areas. In most of the Territory, therefore, even in the seven restricted areas, the large bears are given no protection from residents. For a non-resident, and over most of Alaska, where hunting is permitted from September 1 to June 20, the bag limit is two bears.

No reasonable person would deny to the governing commission the power to limit the activities of animals so large and powerful as the brown bears, but no one can in fairness assert that the bears are now receiving adequate protection. The provision that a resident may kill a brown or grizzly bear whenever it is about to attack or molest persons or property, while seemingly not unreasonable on its face, is one that leaves the bear little security in a land where many of the residents seem to be in favor of its rapid and complete extermination. The idea that it is a manly thing to kill a wild animal is unfortunately still far too prevalent. Many a man who would not face a cow will shoot even a baby bear.

Alaska has the distinction of being the habitat of the largest carnivorous mammals now known, and probably the largest that ever walked the earth. Whether in strict truth this distinction belongs to the Kadiak bear, *Ursus middendorffii,* of Kadiak and Afognak Island, or to the Peninsula brown bear, *Ursus gyas,* no man knows, for no exact measurements or weights of individuals that might fairly be regarded as representing the species have ever been put on record. In addition to these giant bears, Alaska is the home of several other species of brown and grizzly bears whose characteristics are almost unknown, and never will be known unless sanctuaries are set aside where they may be permitted to reach maximum size, and where they may be studied scientifically. Few bears equal in size to those killed 40 years ago are now brought back by the hunters. If the requirements of the situation from the standpoint of the scientist, the lay student, and the Nature lover be met, there must be several sanctuaries.

We believe that an area of suitable size on the Alaska Peninsula should be reserved where no brown bears would be hunted by white men, but where resident natives might be allowed to kill any bears that become dangerous to humans. Such permission, however, should be contingent on absolute prohibition of commercial exploitation. This area would provide for the perpetuation of *Ursus gyas.*

For the benefit of *Ursus middendorffii* there should be another area, preferably on Kadiak Island, or on Afognak Island provided there still exists there a sufficiently abundant bear population to insure the perpetuation of this giant race. Here also hunting by white men should be prohibited, and the killing of individual bears by natives should be rigidly restricted.

Of the islands in southeastern Alaska that have been proposed as sanctuaries for bears we believe Admiralty Island to be the most nearly ideal. This large island is known to be inhabited by at least five species of brown and grizzly bears, all of which are specifically different from the larger brown bears farther north, and are representatives of species found on the nearby mainland. The presence of so many species on one island renders this isolated area one of tremendous potential value as a wild life laboratory where the habits and behavior of the various species might be studied. No other similar tract with equal scientific possibilities of this sort is known. Delay in setting aside this area will result in its value being destroyed through the extermination or serious impairment of its bear fauna.

"TWO YELLOW, GLEAMING EYES IN THE FIRELIGHT . . . A SPOTTED KITTEN THAT HUNG VERY HELPLESS BUT CONFIDENT FROM THE GREAT, POWERFUL MOUTH."

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VOLUME 19 JANUARY · 1932 NUMBER 1

JUNGLE ORPHAN

BY TOM GILL

ILLUSTRATED BY R. BRUCE HORSFALL

SOMETHING was moving down in the tall river grass of the jungle.

I looked at Pedro, but his wrinkled face showed he knew no more than I. Again those tasseled tops of grass waved curiously, but the brooding stillness of the Mexican jungle remained unbroken. Expectantly we waited.

It might have been many things. It might have been wild pig, those fierce little fearless devils that once had kept me perched in a mahogany tree throughout a long, sunny afternoon. Or it might have been alligator, or tapir, or even one of those half pygmy people of the poisoned darts. And since in jungle wisdom the unknown lies always close to the realm of danger, we kept very still behind our screen of low bamboo.

There is a real background of jungle knowledge to Mr. Gill's stories because he has spent many months as a forester in the heart of tropical forests. Mr. Gill is the forester of the Charles Lathrop Pack Forestry Trust and was the leader of the American Nature Association's Caribbean cruise party last year. He will again lead the party sailing for the twenty-three-day West Indies trip next February. Incidentally, any of our readers interested in this trip may obtain further information by addressing the Director of Field Trips, Nature Magazine.

And now all movement had ceased, and suddenly a cry, a kitten's cry, thin and wailing, rose to our hiding place. Downstream a lurking alligator heard and cruised hopefully toward us as again, plaintive and despairing, came that whimpering cry. In two strides I was beside the river bank and looking down upon a small, spotted face, from which two blue eyes blazed up in mingled fear and defiance. Behind me came Pedro's grunt of surprise.

"*Tigrito!* A jaguar kitten!" Then he looked about in quick misgiving. "A poor place to meet the mother, *señor.*"

But I was watching that startled ball of fur and life at my feet. He couldn't have been more than two months old, perhaps less. His fine, downy hair was golden except for the darker spottings of his back and flanks, and little tufts of tawny bristles stood out above his ears. From his mouth a few ridiculous white whiskers straggled. Watching me narrowly, he tried to draw back his lips and snarl and look very fierce, but he wasn't quite equal to it, and finally, giving it up, he sank back on his haunches.

I knelt beside him and held out my hand, but he raised a diminutive soft paw to tell me he was not to be trifled with. Very slowly I moved my hand nearer, and after a time his gesture of defiance faltered. Instead a look of interest crept into his eyes, and the bewhiskered nostrils twitched. Now he took a step forward, another step, and at last I felt his cold, wet nose touch my palm. Then a rough, red tongue emerged and scratched eagerly over my hand and along my wrist.

It was tempting to accept this as a gesture of friendship, but I knew it was the taste of salt that drew him, probably the first this kitten had ever known, for he was still too young to have tasted blood.

For a time we watched each other, then very slowly I reached forward with my other hand and lifted him from the ground. He gave a faint hiss of fear, and I felt his claws close over my arm, but beyond that he made no move, and in another moment I was carrying him back toward camp. Disconsolately the alligator returned to his nap downstream.

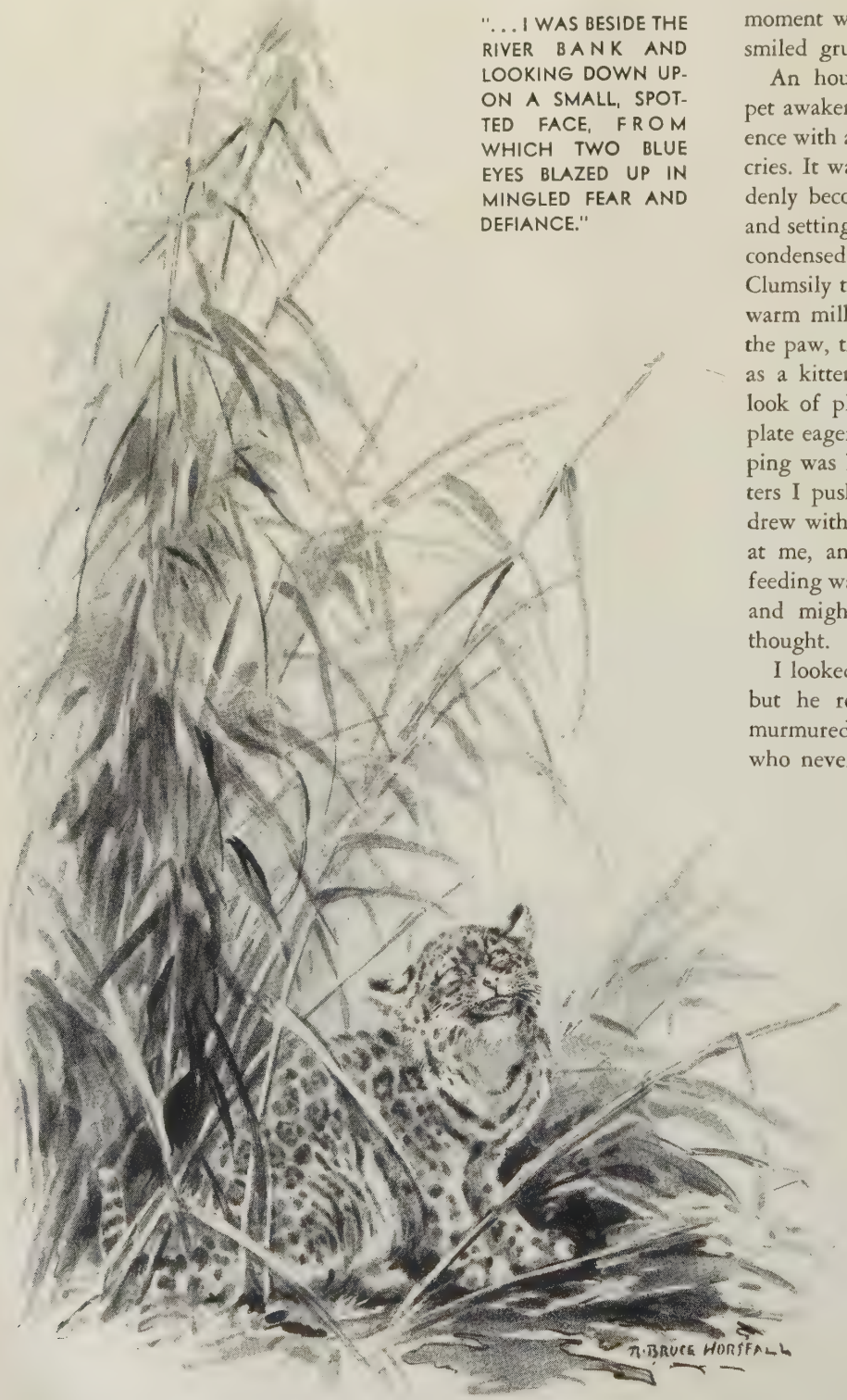
All the way back I could hear Pedro grumbling. What would the *señor* be doing with a jaguar kitten? Where

could we keep it? Suppose the mother should seek it out? And he looked closely at every shadow beside the twisting path.

Well, I wasn't sure myself what to do with him, and I was candidly surprised at finding the little fellow on his own. Only once before had I come across a young cat alone and away from his den, and that was a bob-cat in Arizona. Later I learned its mother had been killed and the kitten was prowling for food. Something like that might have happened here—some one of those unknown jungle tragedies that might have left this fuzzy youngster bereft of parent and of kind.

So for a mile I hurried beneath the hot afternoon sun, and at the clearing where our camp was made I looked down. The kitten, worn out with travel and unaccustomed happenings, and lulled perhaps by the warmth of my body, had fallen asleep.

Just outside the thatched lean-to I threw down a leather jacket and laid him on it. Sleepily he raised his eyes, looked up at me in a puzzled, friendly way, yawned until I could see the double row of tiny milk teeth, and in another moment was asleep again. Even Pedro smiled grudgingly.



"... I WAS BESIDE THE RIVER BANK AND LOOKING DOWN UPON A SMALL, SPOTTED FACE, FROM WHICH TWO BLUE EYES BLAZED UP IN MINGLED FEAR AND DEFIANCE."

An hour later my newly acquired pet awakened and announced his presence with a succession of shrill piercing cries. It was like a dozen catbirds suddenly become vocal. But I was ready, and setting a large plate of our precious condensed milk before him, waited. Clumsily the jaguar put his foot in the warm milk, quickly drew back, shook the paw, then licked it. And, as nearly as a kitten could, his eyes took on a look of pleasure. Then he sniffed the plate eagerly, but the technique of lapping was beyond him, so to help matters I pushed his face in it. He withdrew with milk-covered whiskers, spat at me, and backed away. Clearly his feeding was not yet on a business basis, and might not be as easy as I had thought.

I looked a little hopelessly at Pedro, but he rolled another cigarette and murmured something about people who never grow up. Again the kitten smelled the milk and mewed. Certainly he wanted food. I dropped a piece of cloth in the milk and held it to his mouth, and for a time he chewed with a kind of sucking sound, getting perhaps a few drops down his throat, but it looked like a long drawn out operation.

Then came inspiration. From somewhere in the depths of my duffle bag I brought forth an eye dropper, quickly filled it with milk, and, holding the cat in one arm, I put the dropper between his teeth and squeezed. There was a gurgle, a look of intense surprise, another gurgle, and

"IN A BRANCH ABOVE, TWO SPIDER MONKEYS WATCHED CURIOUSLY."

at last a sigh of utter contentment. The eye dropper was empty. Triumphantly I grinned up at Pedro.

It took an amazing number of eye droppers to fill my infant, but at last, round eyes drooping with repletion, he pushed my hand away and I laid him down on the jacket. He looked around, yawned, stretched, purred for a second, then dropped his head between those sheltering soft paws. He was asleep.

That same afternoon Pedro and I built a kind of rough stockade beneath the giant ceiba tree near our lean-to. Driving stakes well into the ground and close together, we wove tough vines—*lianas*—in and out to give the whole thing strength. That was where my jaguar was to spend his first night.

As a matter of fact he did nothing of the kind.

For he must have decided that, although obviously unsatisfactory from many standpoints, I was the nearest thing to mother that he could find around camp, and he was not to be separated from me that first night. So from dark until bedtime he snarled and cried and bit at his prison walls, and as soon as I went inside the lean-to he raised a lamentation to high heaven that made even the howling monkeys down by the lagoon pause in envy. The fire died, but the serenade went on, gaining in volume. Sleep seemed very far away.

At last Pedro's patient voice sounded at the entrance.

"Is it the *señor's* thought that I let this ungracious beast go and bring us peace?"

I replied a little acidly that nothing could be further from the *señor's* thoughts, and, feeling around for my moccasins, went out into the moonlight.

Dark and mysterious, the jungle loomed like an impenetrable wall about me, and I had that feeling of being spied on by a thousand unseen eyes.

Into the little stockade moonlight filtered from among

the ceiba branches, and I could see small teeth glisten as my kitten tore the tough wood. For a while he worked in savage silence, then with all his tiny might he struck with both paws at the stakes, and once again threw back his head to fill the night with lamentation. But suddenly he had seen me, and with a glad little cry stood up on his hind feet, begging to be lifted out.

What could one do? I raised him in my arms and walked back to bed. The rough, wet, red tongue licked my neck and a vigorous purr began to vibrate through him. Praying that Pedro wouldn't see me, I pulled the blanket over both of us, and there, head tucked beneath my chin, the jaguar spent a perfect night.

For me it wasn't quite so perfect. Twice he dreamed, and his needle-like claws pricked me. Then, too, he had a way of purring that seemed to fill the whole lean-to. It was a kind of double action purr, working on both the intake and exhaust, and before morning I began to entertain doubts as to my entire wisdom in adopting this jungle orphan.

All next day Pedro and I explored the upper river, leaving our jaguar in his stockade to howl or doze, whichever he preferred. And that evening we found him sleeping, curled up tightly on my jacket, while in a branch above two spider monkeys watched him curiously. They fled at our approach, and as he awakened I opened another can of milk and repeated the laborious task with the eye dropper. But it was getting easier. We were both learning the trick of it, and soon his tan stomach was round and full of milk, and he crept close to the fire and slept.

It is my last real memory of the little chap, curled there in happy contentment, the reddish, flickering firelight on his spotted fur, the tufted ears thrust forward and the long tail moving nervously as he slept.

Very carefully I lifted him, jacket and all, and laid him down within his stockade, then tip-toed back to the fire. Evidently he hadn't wakened, for no sound came, and, breathing more easily, I rolled a cigarette of Pedro's strong Mexican tobacco. For a time we sat there watching the flames. Slowly, as daylight died, the dark jungle shadows crept closer, and high up, lured by the campfire, two vampire bats whirred back and forth, peering with evil, unblinking eyes down upon us. Not even a night bird called, not a ghost of a breeze among the tree tops. A great peace, the evening jungle peace, held all that silent world.

Then suddenly the spell snapped. A roar, deep and insistent, rumbled from out a palm thicket beyond the clearing, and a dead branch cracked. Again the jungle night shook with that deep, far-reaching call of a full grown jaguar, and even the graying embers of the fire seemed to flicker. In the next second, in the smallest fraction of a second, the same thought came to Pedro and to me—*"The mother jaguar!"* Together we dashed toward the stockade. If we could only get our hands over the kitten's mouth before he uttered a cry!

Almost we were in time—not quite. For as we reached over the low barrier my awakened captive raised his head and sent answering back through the jungle his thin, wailing, helpless cry.

We stood motionless. Pedro's lips had drawn back in a grimace of consternation, but even before we could turn the bellowing, triumphant roar of the aroused mother ripped its way toward us and we heard the tearing of palm leaves as though a heavy body moved swiftly through them. I caught a glint of yellow on the edge of the clearing, heard again the wild, defiant, deep-throated roar, and dived in ignominious flight for the lean-to.

I never knew anything the size of a .45 automatic could be so hard to find. From the duffle bag I pulled rolls of film, yards of bandages, and dozens of towels, scattering a box of gift cigars over the floor before I finally laid eager fingers on the weapon. Cocking it, I stepped outside.

There, just beyond the dying campfire, stood a female jaguar. Her great powerful head was up, sniffing the

"CLUMSILY THE JAGUAR PUT HIS FOOT IN THE WARM MILK, QUICKLY DREW BACK, SHOOK THE PAW, THEN LICKED IT."

air, and her tail lashed slowly back and forth, every muscle poised and ready. She was magnificent!

Almost at once she must have caught my movement, for her head lowered and her lips curled back, showing keen, white fangs, while those greenish yellow eyes seemed to hold a light that came neither from the moonlight above nor the campfire at her feet. I made no move, and at one smashing blow the great beast flattened our stockade level with the ground.

With a cry almost human in its gladness the kitten ran toward her and rubbed himself against the soft fur of the mother's side. A kind of purring, questioning sound quivered in the mother's throat as she lowered her head and licked the youngster, then lifted it gently by the loose folds of skin about its neck. Not once a sign of fear. She was superbly beyond fear. To me who stood there watching, she typified that imperishable quality of wild motherhood that dares all, and, if need be, sacrifices all.

Again those greenish yellow eyes regarded us. Like a brooding, solitary statue she stood there, silhouetted by the campfire's last faltering flames against that silent, moonlit jungle her long, powerful body poised and ready. From beside me came the sound of Pedro's quickened breathing, and in a voice that trembled with excitement he whispered, "Shoot, *Señor*. Shoot quickly."

Still I stood hesitant, with cocked revolver. So easy a shot. And somehow at that very moment I wanted that kitten more than all else. A pressing of the finger, a shot, and he was mine. But the finger wouldn't move.

And that is my last memory—two yellow, gleaming eyes in the firelight there on the edge of the jungle, and a spotted kitten that hung very helpless but confident from the great, powerful mouth.

In the next moment they were gone. Only the fading embers that lighted up an empty jungle clearing and the pious whisper of Pedro behind me.

"Gracias a dios," he murmured, and made a shadowy sign of the cross.

" . . . SHE LOWERED HER HEAD AND LICKED THE YOUNGSTER, THEN LIFTED IT GENTLY BY THE LOOSE FOLDS OF SKIN ABOUT ITS NECK."

MORE • • WINNING PICTURES •

Here are ten more of the successful pictures in Nature Magazine's photographic contest of last summer. Other winning pictures will be printed in forthcoming issues. These two pages illustrate the wide range one has for one's camera subjects.

$10 Prize—AN ARISTOCRAT—Taken by Mrs. W. A. Miller, Cadillac, Michigan

$5 Prize—SWEET SONGSTER —Taken by T. C. Atkinson, Mission Beach, California

Special Award—BARNYARD FRIENDS—Taken by Mrs. Joseph Watson, Yalesville, Connecticut

$5 Prize—'COON—Taken by Herman Hinrichs, Grand Rapids, Michigan

$10 Prize—POLE VAULT—Taken by Karl K. Nelson, Newton, Kansas

$5 Prize—SUNSHINE AFTER THE STORM—Taken by F. Lewis, Melbourne, Australia

$5 Prize—COY MISS—Taken by H. G. Aitken, Syracuse, New York

Special Award—WINDY DAY—Taken by C. H. Welch of St. Louis, Missouri

$5 Prize—IRISES—Taken by Enid R. Heine, Windsor, Connecticut

$5 Prize—A HOLLAND CANAL—Taken by Madeleine L. Glavin, San Francisco, California

THE "MASTER WORD"

BY DALLAS LORE SHARP

ILLUSTRATED BY R. BRUCE HORSFALL

"EVERY FALL THE SWALLOWS LEAVE EARLY FOR THE SOUTH"

This is the second part of the beautiful two-part essay in which Dallas Lore Sharp, the late beloved writer-naturalist, sought to express a philosophy of the world of Nature. The first part appeared in the December issue of Nature Magazine

"ALL FLESH is grass"— a cryptic saying of the Bible that seems to mean that no life is for very long, that life is of one piece, that no one, bird or beast or man, is very wise or very strong or very happy. And we know this is true of all men; but how difficult for us to think of it as equally true of all wild animals!

Every fall the swallows leave early for the South. Just so every fall we see them go with envy, my mate and I. We take trial flights with them from the telephone wires, the lure of sunnier lands tugging at our wings, while tugging at our hearts is the lure of our nest in the roof-tree. Then suddenly they are gone, and we are left with the crows and jays and chickadees, to shiver like them through the gray days and the long bitter nights of cold.

They must put on more feathers, we must put on more clothes, and all of us must adjust ourselves as best we can to conditions which may prove to be more than we can meet. We behave exactly alike under new conditions. The trees down the hillside weave a new and all but impenetrable screen of branches every summer, but the birds dart through the tangle with lightning speed and rarely a bruised head or broken wing. In the midst of the trees stands the house with a large arched porch screened in by dark copper wire; and I am glad every autumn when I can take away those screens, so many birds have bumped their silly heads, and hurt their wings, and even fallen dead against the arches, especially in the spring before they have become accustomed to the wire, and in the fall during the warbler migrations. The sharp-eyed warblers are in frequent and fatal collision with the screens. The home birds, except the cuckoos, learn soon to avoid them; but the cuckoo is either a weak-eyed or a very unobservant bird, for many here came to grief.

In motoring home from California in June I was aghast at the destruction of wild life along the transcontinental highway. The slaughter seemed to be greatest in the West and the far West. For miles and days I studied these motor accidents, and I can believe the recent report which estimates a million dead birds annually as our motor toll. But see the total of human deaths from the same cause. We seem as slow to learn as the birds, slower, possibly; for I think the birds are learning, or do I imagine that I see fewer dead on eastern roads than on the roads of the West?

Driving my own car I killed to my certain knowledge only three birds between the two coasts, but there was an average of one dead bird to the mile over all of the long road. It was most depressing, and usually quite unavoidable on the driver's part. At night my headlights would pick out desert rat or burrowing owl, blinding and paralyzing the creature with wonder or fear. If not too close, and I were quick, I could spare the thing. The little marmots, jack-rabbits, and squirrels were ever under the wheels. One day, close together, we came upon two badgers in the desert, headlight victims, both of them, probably.

After careful watching I concluded that at a speed of twenty-five miles an hour there was never a fatal accident, except at night. That rate always surprised the birds, but they were quick enough of wit and wing to get away. At thirty miles, and faster, however, they were grabbed by the grill as they rose from the road, or they struck the hood, and sometimes the windows as they tried to cross. And in the many cases of near accidents that I

witnessed the creatures plainly miscalculated the speed of the car—waiting too long in the road, or dashing into the road to cross at too slow a speed.

Are they learning how to meet this new foe, I wonder, here in the East where the roads are crowded, and where I do not seem to see so many dead? Or are there more birds to be killed in the West? And do the cars move faster out there? Like the cuckoos and the screened porch, the red-headed woodpeckers and the cars in the West appear to get fatally mixed. They seem hopelessly stupid birds, having used their heads for hammers so long as now to be incapable of thinking with them. You will see one ahead of you clinging rather pathetically near the top of a telephone pole, and you will have to slow down, for the solid-headed thing will make up its wings to fly about the time you are abreast, and it will be sure to fly across the road and into the moving car. Jay-flyers, poor things, and just like jay-walkers!

In the round of their regular activities, and where they are naturally concerned, the wild animals are keen observers and amazingly alert. But they too are dulled by routine, and like us, are liable to lose their care and caution when custom hardens into habit.

The town of Vermillion, Ohio, has been distinguished for many years as the residence of a pair of bald eagles, our national birds. It appears that the birds settled in Vermillion in 1840 and dwelt there in the same tree until 1863, when they moved into a new nest-tree. This tree was promptly destroyed in a storm, and the birds moved again, keeping this third house until 1890. The fourth nest was started that year in an old shell-bark hickory at a point about 81 feet from the ground. For thirty-six years running this nest was made over every spring and occupied by the eagles—"a record probably unmatched in the annals of natural history."

". . . . CAUGHT THE TOWERING EYRIE IN ITS MIGHTY HANDS AND HURLED IT CRASHING TO THE GROUND"

Year by year the nest grew in height and weight and circumference. But the old shell-bark was not growing in strength year by year to meet the growing burden of the nest, a detail in the engineering of the structure left out of their reckoning by the eagles. Thirty-six years is a long time in the experience of an eagle, or in a man's experience, for that matter. What had stood the storms for thirty-six years must certainly stand firm for years to come, reasoned the great birds, if they reasoned at all.

But it was apparent to Dr. Herrick of Western Reserve University that the winds blowing and beating upon that lofty house must some day cause it to fall. So he and other friends of the great birds erected a tower beside the nest and measured it, finding it twelve feet in height, and eight and a half feet across the top, estimating the weight of the eyrie as close to two tons. The top of the nest was a nearly level platform covering over sixty square feet.

Up to 1922 the forking branches of the hickory that held the nest showed signs of life. Then there came a change. But the eagles did not notice the change. The next spring they added three more inches to the height of the nest, and perhaps a hundred pounds to its weight. So did they the following spring of 1924. In November of that year the male bird was wantonly shot and his old mate disappeared. No eagles were seen about the eyrie until the twelfth of February of the new year when a pair of the noble birds appeared and began to refurbish once more the ancient keep. A clutch of eggs was laid and the brooding began.

Both of these birds may have been new to the scene. It is almost certain, however, that the widowed bird had brought back a new mate to the old home. Be

that as it may, the pair took things as they found them, added the necessary new furniture, and began the serious business of a family. The nest-tree had stood the storms for thirty-six years, what better guarantee could men or eagles ask than that? But on the tenth of March, before the eggs were hatched, a wild gale swept over that country, and marking the dying shell-bark for destruction, caught the towering eyrie in its mighty hands and hurled it crashing to the ground.

Rats, they say, will sense their danger and quit a sinking ship. Their long fight on land and sea with their wily enemy man has sharpened their wits, it seems. The eagle tree stands aloof. The soaring birds will dwell with men, but have no commerce with them, nor learn of them. A hundred years of dying in the top of the tall shell-bark would have conveyed no warning to the birds. The worms might bore and the winds might besiege the castle. It had always stood; why should it not always stand? That there were no green leaves about the nest any more meant nothing. They could not see that

the huge pile had risen higher by full three inches every spring, nor that its overhanging floor had spread, nor that its thickened walls had grown weighted with the years.

But the mining worms knew. And the baffled, besieging winds knew. And when the old tree's time was come the winds were there to clear the giant cumberer from the sky. Nature is wise, wiser than eagles or rats or men; and if sometimes cruel, never in the long, clear light of things is she blind. Young shell-barks are growing. Life and calm and order triumph. This is the large abiding truth of Nature upon which men and eagles build, whereon faith and peace and effort rest.

Eagles know that. But wisdom is the use of knowledge, and eagles are wise with the wisdom of all life, for after a week of mourning about the woods they began to build again, in a tree about five hundred feet from their former site. The work required a week, and in the course of the spring the young were safely launched into their new world. That was in 1925.

The spring of 1926 found the old birds back at their housekeeping. By March eighteenth the eggs

" . . . THE CRY OF THE CIRCLING EAGLES . . ."

had been laid and incubation begun, and high in the air, looking into the nest, had risen a new steel tower at the hands of Dr. Herrick and other friends of the birds. April twenty-second the eggs hatched. There were three of the eaglets in snowy natal down. By the middle of May they had changed to gray down and then to real feathers—great brown-black birds now nearly ready for the clouds. Life in the towering eyrie was at its peak.

"During the night of May 19th," writes Mr. C. M. Shipman, one of the builders of the tower, to me, "I was awakened by a fierce hail and wind storm, and I wondered about our tent on the tower by the eagles' tree. Early the next morning I went out in the dark, the rain and wind still raging, and over to the woods. I had always looked up as I approached the tower to see how the old birds were faring, and I did so now. What was my horror to find the top of the tree gone! I thought I was crazy. But there on the ground at the base of the tree lay the nest, a sodden mass of débris. Out from under the mess I retrieved the bodies of the three young eagles, while overhead the old birds circled, crying at me as if I had done the terrible deed."

I cannot put my finger on the Master Word in that throbbing paragraph but I know that the Word is there. "We be of one blood" is there. "All flesh is grass" is there. Yet no lack of wonder and love and understanding because the grass withereth. If there is something less piercing in the cry of that paragraph than in the cry of the circling eagles, it is not less poignant. I wish he had cried it aloud to the wounded birds. I wish I could publish it to every wounded thing in all the world.

There is no escaping from pain and no solving of the problem of it. It ushers life in, and thrusts life out, a companion more or less on the journey, less companion than attendant generally, who is always within swift summons. I am not attempting to reason about pain, but only to acknowledge it, the common heritage of all flesh, as a common bond in the strong world of Nature.

U. S. WEATHER BUREAU

A STANDARD WEATHER BUREAU VANE

Note the spread tail which is a feature of most scientific vanes

WHICH WAY'S THE WIND?

BY CHARLES FITZHUGH TALMAN

"EVERY wind," wrote Francis Bacon, "has its weather," and many proverbial sayings about the relations of wind direction to weather were current long before modern meteorology, with its synoptic charts, made clear the reasons for these relationships. Such sayings indicate some of the reasons why men have always been interested in knowing which way the wind blew, even if they were not sailors, dependent upon its favorable course to get them speedily to the havens where they would be.

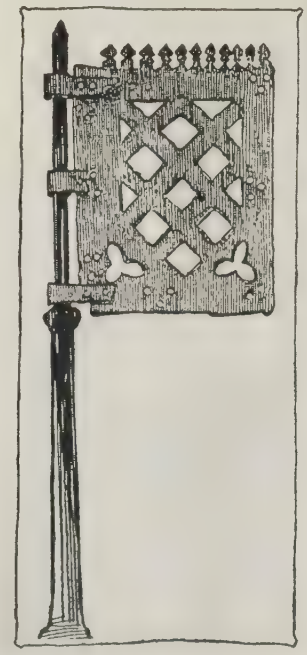
Man's interest in this subject is evinced in a bewildering diversity of weather vanes. No other weather instrument has assumed a thousandth part as many shapes as has the one originally designed for the mere practical object of pointing out the direction of the wind, and no other has become the embodiment of so many ideas that have nothing to do with meteorology. Let us take a little walk about the neighborhood for the purpose of observing some of the forms affected by this familiar contrivance. Later we shall try to find out whether any of these forms have particular meanings, or whether they represent merely the haphazard fancies of the craftsman.

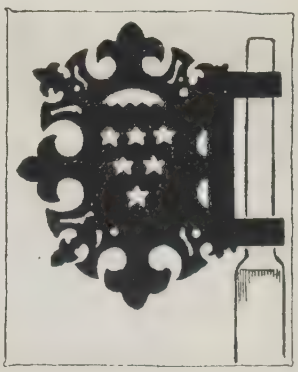
We shall begin with that most aspiring of vanes, at the tip-top of the church steeple. It gleams in the sunshine, holds its head erect and proudly surveys the landscape. One expects momentarily to see its wings go flap-flap and to hear a stentorian crow. All your life you have beheld this glorious, bellicose bird on the spire, and perhaps never until this moment have you asked yourself why he is there! Why a weathercock, rather than a weather *dove,* for example? Why, indeed, any bird or beast? Here is a mystery that demands elucidation.

About town we find an astonishing variety of vanes; astonishing, at least, to those who have always taken weather vanes for granted and never given one of them a second look. Apparently there are

SOME OLD ENGLISH WEATHER VANES

Below is one from Charlecote, the seat of the Lucy family in Warwickshire. In the middle we have an interesting old vane that adorns the steeple of the Etchingham Church in Sussex. Below is an interesting old vane from Oxburgh Hall in Norfolk





RUDAUX'S RIBBON VANE
The direction of the wind is noted by looking in a graduated black mirror

vanes for every taste—or lack of it—and the householder has almost as much latitude in the choice of a vane as the merchant has in the choice of a trademark or the bibliophile in that of a bookplate.

As we proceed we see that, in many cases, the design of a vane bears some relation to the character of the building on which it is placed. Sometimes this relation is merely esthetic; the vane harmonizes with the architecture of the building, and that is all. Very often, however, an attempt has been made to give expression, in the vane, to some function the building performs; or, in the case of a dwelling, to make it emblematic of the owner's tastes or habits.

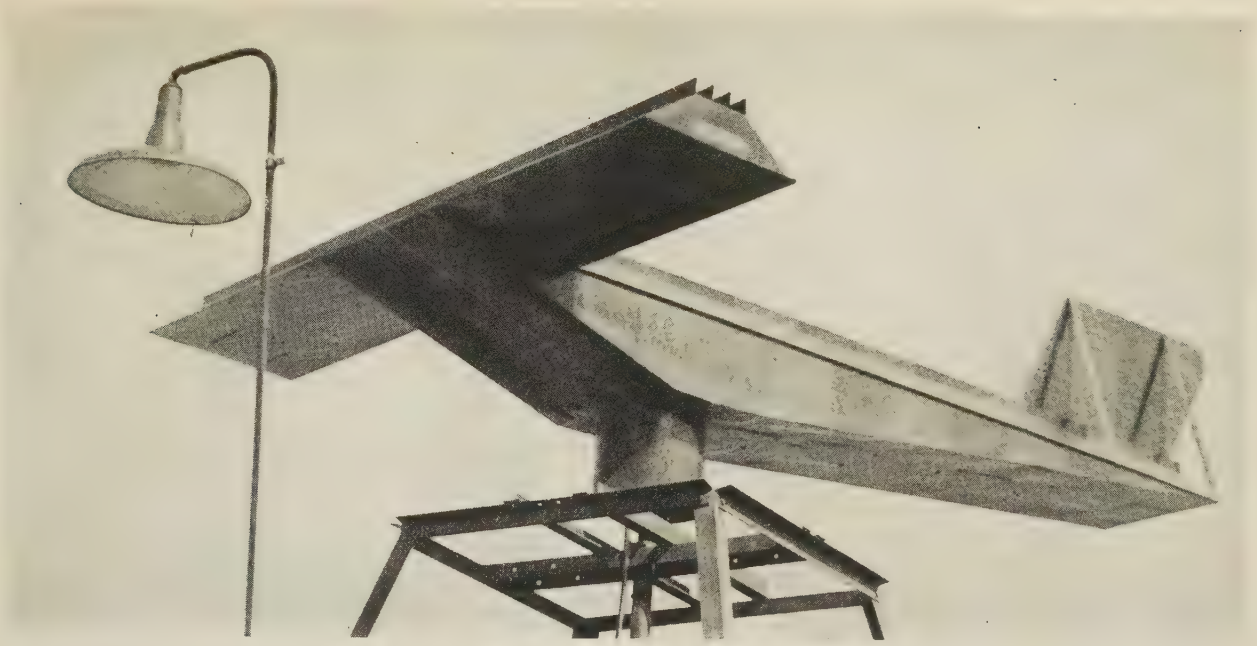
Some vanes offend our eyes by an excess of realism. Instead of being subtly symbolic, they are mere effigies. Among such are the gilded cannon over the armory, the hook-and-ladder over the headquarters of the fire brigade, and the trumpery motor-car over our neighbor's garage. When stables flourished, the simple gilded horse was a graceful emblem, too often spoiled by the addition of a buggy or sulky.

Arrow vanes, varying greatly in details of ornamentation, are among the most pleasing designs, because they attempt to convey no particular idea beyond that of aiming straight at the wind's eye. Among those we encounter in our ramble one fixes our attention by its uncompromising simplicity, its lack of gilding, and, especially, by its spread tail. On inquiry, we learn that the house surmounted by it is occupied by a dilettante meteorologist; to wit, the local volunteer observer of the Weather Bureau.

His is a scientific weather vane; often called, by way of distinction, a "wind vane," or, if you prefer a more pretentious term, an "anemoscope." The spread tail gives it great steadiness. It does not gyrate about erratically, as do most vanes. It is most carefully mounted on ball or roller bearings; it is kept well oiled; and its location has been chosen with due regard to catching every breeze that blows, for it overtops the surrounding trees and buildings. Perhaps its axle is carried through the roof and fitted with a ceiling dial, so that its owner may observe the direction of the wind without going out of doors; or, again, it may be connected electrically with a pen that traces a continuous record of the wind's vagaries on a moving strip of paper.

The amateur weatherman's vane was the only strictly utilitarian one in the community until the equipment of the new airport made us familiar with the "wind cone" and the "landing tee." The former is a sleeve of light fabric, open at both ends, which stands out horizontally and takes the shape of a truncated cone when inflated by the wind, but

THE GILDED DRAGON OF GHENT
This curious vane, ten feet long, has surmounted the "Beffroi" tower since the 14th Century



A WEATHER VANE THAT THE AVIATOR CAN SEE FROM ALOFT

PHOTOGRAPH FROM CLAUDE NEON LIGHT, INC.

Illuminated "landing tee" at the Cleveland Municipal Airport, showing the direction in which to land. It is outlined by red and green neon tubes

hangs limp in calm weather. The landing tee is a big vane, brightly lighted by night and having the general outline of an aeroplane. The pilot in the air learns from it which way the wind is blowing close to the ground and is thus enabled to head into the wind in landing.

We have reserved for the last a particularly graceful variety of vane, the most conspicuous example of which we find crowning a turret of yonder stately mansion on the hill. We note that, unlike the majority of weather vanes, this one conforms to the literal and original meaning of the word "vane," for it is a conventionalized flag or banner. It is perforated with figures showing the year in which the building was erected. Its ancestor of some centuries ago would have borne, instead, a painted or perforated coat-of-arms, and might have turned on a vertical rod held by a bird or beast sitting on a pedestal.

So much for our perambulation. Now let us withdraw to the library, where we may take a broader outlook with the mind's eye.

Weather vanes were known in classical antiquity, though, strange to say, no Greek or Latin name for them has come down to us from that period. The earliest of which we have any record must have had a good many predecessors, as its elaborate construction implies a preliminary process of evolution. It was made of brass, in the shape of a Triton, and stood at the top of a little octagonal building at Athens, erected about a century and a half before the Christian era and called in later times the Tower of the Winds. The building is still in a good state of preservation, but the vane has long since vanished.

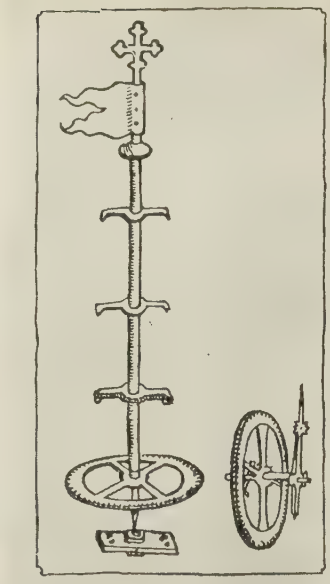
The Triton held a wand, which always pointed to the wind and likewise to one or another of eight bas-reliefs carved on the faces of the tower. Each of these figures was symbolical of one of the eight winds recognized by the Athenians. If the wind was in the north the Triton turned his wand to the figure of Boreas, a crabbed-looking old man in a heavy cloak; if south, to Notos, a youth bearing a water-vessel (to signify that this wind brought rain); if west, to graceful Zephyr, dropping spring flowers from the folds of his garments; and so on. The

A COPPER BEAVER

It serves as a weather vane on the building of the Hudson's Bay Company in London

COPPER AND BRASS RESEARCH ASS'N.

AIRPORT WIND-CONE
Fliers call it the "sock." It is illuminated at night



EGNATIO DANTI'S VANE
A 16th Century contraption. Indoor dial at right

A GRASSHOPPER VANE
Cleaning the famous emblem on the Royal Exchange, London

figures are familiar today through frequent representation in books and they furnish an interesting illustration of the fact that even in ancient times particular types of weather were associated in people's minds with the different wind directions.

The learned Roman M. Terentius Varro had on his farm a vane embodying the modern feature of an indoor dial, and this idea was revived toward the end of the sixteenth century of our era by another erudite Italian, Egnatio Danti, who erected several vanes of this sort in Bologna and Florence, some fitted with horizontal dials on the ceilings, others with vertical dials on the walls. Danti published a book in 1578 in which such vanes are described and illustrated.

The weathercock, in the literal sense of the term, dates back at least to the ninth century, for in the year 1652 it was recorded that a vane of this shape at Brixen, in the Tyrol, bore an inscription stating that it had been erected by Bishop Rampertus in the year 820. Brewer, in his *Dictionary of Phrase and Fable,* tells us that a Papal decree of the ninth century required that every church steeple should be adorned with one of these birds, as the emblem of St. Peter, but this statement appears to be unfounded. The origin of the weathercock is, in fact, still obscure, though there has been no lack of speculation on the subject.

One thing is certain; this particular form of vane was used widely, and almost exclusively, on ecclesiastical buildings for hundreds of years, and therefore must have had some special religious significance. The idea that the cock typified, not merely clerical vigilance, as is often stated, but the priestly office in general is curiously developed in a well-known Latin hymn, "Multi sunt Presbyteri," etc., said to have been written in or before 1420. A translation is included in John Mason Neale's *Mediaeval Hymns and Sequences:*

Many are the Presbyters
  Lacking information
Why the Cock on each church tow'r
  Meetly finds his station;
Therefore I will now hereof
  Tell the cause and reason,
If ye lend me patient ears
  For a little season.

Cock, he is a marvelous
  Bird of God's creating,
Faithfully the Priestly life
  In his ways relating;
Such a life as he must lead
  Who a parish tendeth,
And his flock from jeopardy
  Evermore defendeth . . .

And so on, through fifteen stanzas, drawing almost every imaginable parallel between cleric and Chanticleer, even to the resemblance between the cock's bald pate and the tonsure!

However, many other forms

A SILHOUETTE WEATHER VANE
One of the innumerable dainty and attractive designs for such vanes

of vane have been used on churches, and nowadays the weathercock is hardly more common in this situation than arrows, fishes, and the like. In the Old World symbols of the various saints are found on churches dedicated to them; as in the case of the Key on St. Peter's, Cornhill, and the Gridiron, on St. Lawrence's, Jewry, both in London. Human figures have also been used. Perhaps the most famous weather vane in the world is the "giraldillo" on the Giralda at Seville—a bronze female figure thirteen feet high representing Faith, which weighs a ton and a quarter, but turns easily in the wind.

Banner-shaped vanes were once the exclusive prerogative of aristocratic castles and manors. In mediæval France the shape of the banner-vane denoted the owner's rank, and the lower orders of society were prohibited by law from using vanes of any kind.

Besides vanes artistic, symbolic and scientific, there are various rough-and-ready devices for finding out which way the wind blows. The dog-vane, used on shipboard, is usually a simple ribbon of bunting attached to a weather shroud. Sometimes it consists of thin slips of cork, stuck round with feathers, and strung on a piece of twine; or again it is a funnel-shaped contrivance, made of bunting, quite similar to the wind cone of the aviator. All out-of-door folk, whether by land or sea, are familiar with the expedient of wetting a finger and holding it up to determine how the wind blows. The wet skin, when turned to the wind, is, of course, cooled by evaporation. The smoke from chimneys is one of the best of makeshift vanes. Sailors sometimes throw a piece of live coal into the sea and notice which way the steam inclines.

The kingfisher is called "the natural weathercock," and thereby hang two tales. One, possibly true, is that, if the dead bird be properly suspended outdoors, its breast will always turn to the wind. The other, obviously nonsensical, is that the same procedure will work indoors.

MY FIRST WATER OUZEL

BY ELLEN HOWARD MILLER

• • •

ONE OF the longed for wishes of years was realized at the close of a lovely June day, when we brought the car to a halt near a rushing, tumbling stream at the foot of the Rockies. As we walked back to enjoy at close range the beauty of the stream, the clear sweet song of some invisible bird was borne to our ears. We stood very quiet on the bridge, listening intently. While it seemed very near, as though we were surrounded by the bubbling, tinkling melody, our eyes could see nothing.

At first I thought it came from one of the lofty cliffs just before us, and wondered if it could be a rock wren, giving us his goodnight song. Another of the party was sure that it was near the bank of the stream. But after peering here and there, we finally gave up the search, and went in to our belated dinner, feeling that our bird friend certainly had "a tryst with twilight."

We had just sat down to the table, and I had lifted my glass for a drink of sparkling ice cold water that came from a snow capped mountain. Again came the clear sweet song. I rushed to an open window just over the stream. There, in plain sight, and under the stone bridge, was our songster, a water ouzel, dipping and skimming back and forth, from side to side, over the rushing, tumbling water, and still singing " the song of the brook."

How I did wish that the "wreath of dangling water smoke" would lift, and possibly let us see that beautiful, round mossy nest, securely fastened on some rocky ledge, where it is kept green by the constant spraying from the stream. Perhaps the side opening would be filled with two or more little heads of the brood of four or five babies that usually fill the nest.

The water ouzel is a brave, gallant bird, and I can just imagine him, with his short perked-up tail and stocky body faultlessly dressed in a plain suit of gray, bobbing and dipping as though giving thanks.

I like Frank M. Drew's beautiful description of these birds. He says: "They are the very embodiment of a mountain torrent—bustling and energetic: and their song is like crystallized spray. Sweet, sparkling and vivacious, taken with its surroundings, I do not know of any bird song which surpasses it."

It did indeed seem to fit into the surroundings. And when you realize that these dauntless birds find pleasure in going against a strong stream, sometimes making their nests in the space between a waterfall and the rocks over which it leaps, so the parents have to dive through the spray to reach eggs or young, you feel that you are most fortunate to have just a glimpse of them and doubly so to have heard the "sunshine notes of a streamside bird."

LAMPS THE INSECTS LIGHT

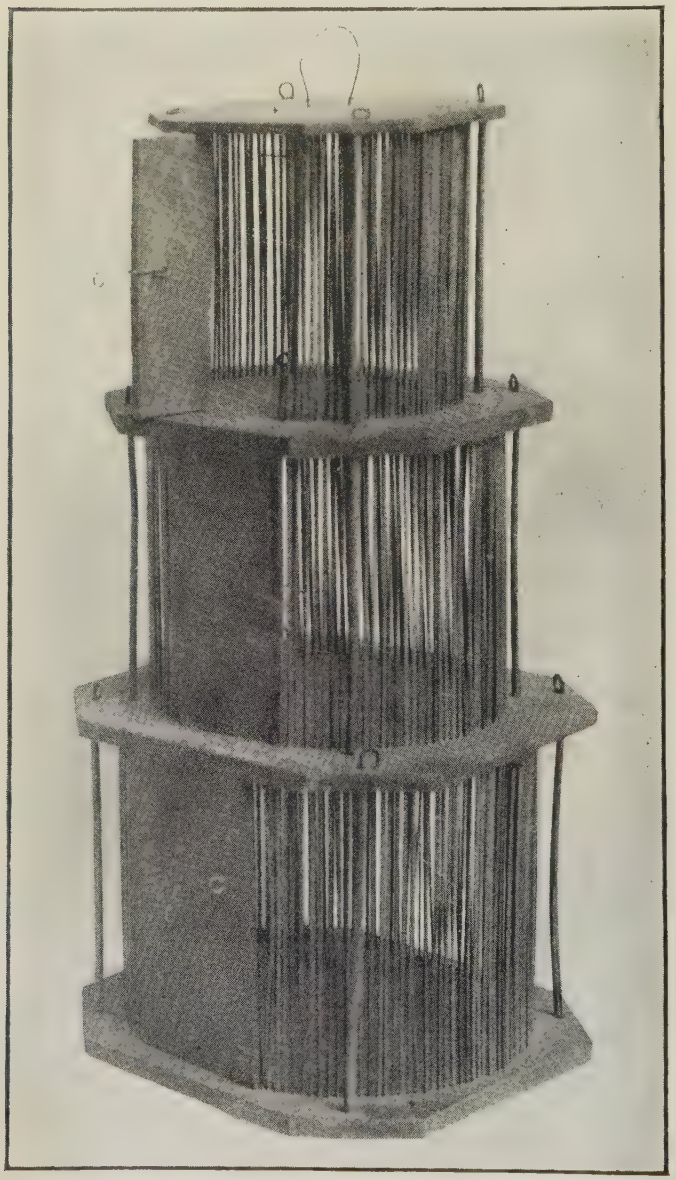
FILAMENTS AND VACUUM TUBES MEAN LITTLE IN SOME PLACES

BY LOUIS E. REICHARD

Not so long ago a lamp that could hear was demonstrated at the Newark, N. J., airport. This lamp's ear was attuned to pick up or catch the note of a certain siren. That particular siren was a part of the equipment of an airplane that came soaring over the airport. The aviator sounded the note, the ear heard, and hearing it operated a switch that caused the landing field to be flooded with light, enabling the airman to land safely. It is a valuable contribution to aviation.

This "lamp" was really a vacuum tube, a close relative of the radio tube, equipped, through the wizardry of science, with a sensitive ear.

There are today many other marvelous lamps with which we are far better acquainted. They range from the tiny "grain of wheat lamp" that dentists and surgeons delight in using when making their explorations in the internal regions of the human body, to the brilliant radio beams whose rays are visible for miles from the point of emanation.



A WEST INDIAN FIREFLY LANTERN

Behind the reeds enough of these insects were imprisoned to provide light

When we think of these lights, compared with which even Aladdin's wonderful lamp must fade into insignificance, it is almost impossible to realize what crude methods of lighting have been, and even now are, in use.

Nearly every one knows what an important rôle the stormy petrel, the now extinct auk and the candlefish have played in furnishing man with light. The methods by which they were converted into torches and lamps are familiar to all. But there is one natural source of illumination that has been used in effective and ingenious ways, about which comparatively little has been written. That is the firefly.

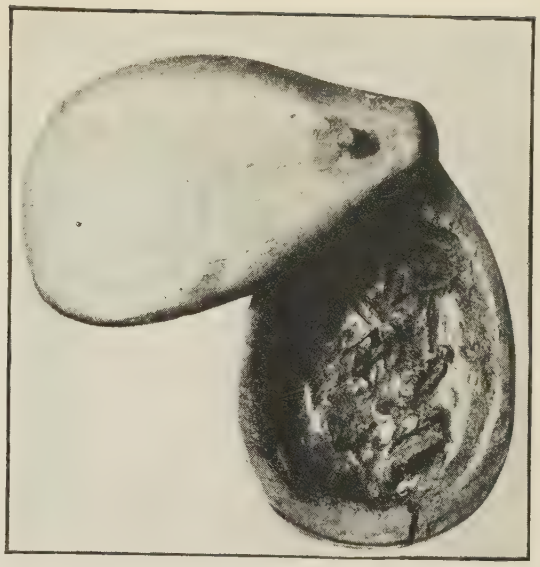
In an early account of tropical America an historian speaks of a great beetle "somewhat smaller than a sparrow, having two stars close by its eyes and two more under its wings." This large beetle's lighting plant furnished such good light that the natives were able to spin, weave, write and paint by it. The Spaniards, when they wished to hunt at night, fastened beetles to their thumbs and big toes. Used in this way the insects served the double purpose of making light and luring little rabbits that were attracted by the light.

Fireflies that were not large enough to be tied to thumbs or great toes have been used extensively in a great many countries. Naturally enough, because they were used in such numbers, it was necessary to provide means to confine them. Novel methods for accomplishing this were devised. In the West Indies they use a lantern, a sort of three-story tenement, made with gratings of small rods. A somewhat simpler house of detention, prison, or lantern, as the case may be, is a common gourd with a number of perforations and a crude door.

An ingenious contrivance that serves both as a flashlight and a place of confinement for fireflies is used by the people of Java. It is a shallow

AN INSECT FLASHLIGHT OR BURGLAR'S LANTERN

At the right the shallowed-out dish contains pitch at the bottom in which are imprisoned the insects, the pivotal upper section serving to cut off the light. An extra supply of insects is carried in the hollow cane shown at the left

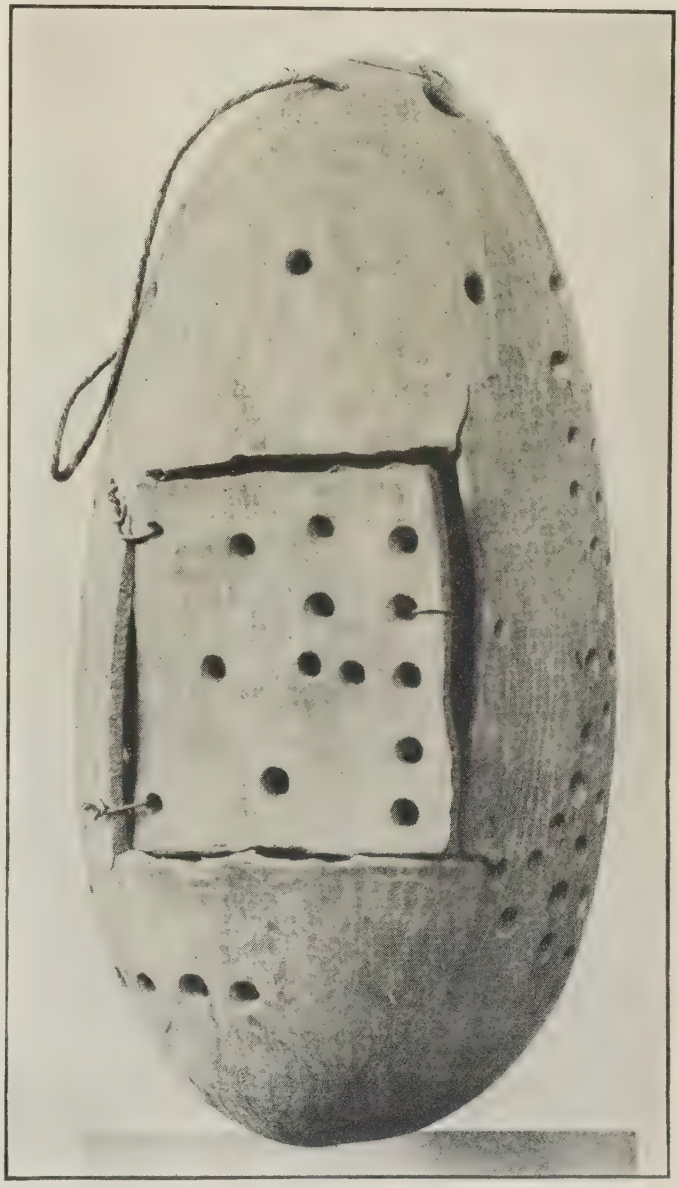


wooden dish on the bottom of which there is pitch. Fireflies are made captives by sticking them on this material. A lid that is pivoted on one end permits of ready opening and closing. An additional supply of "batteries" to be used in case of emergency is carried in a cane tube. The story runs that this unique contraption is a burglar's dark lantern, and has been so used. At any rate, it is easy to imagine that it is the great-great-granddaddy of the flashlight now so extensively used in the United States.

Years ago the Smithsonian Institution at Washington received from Chinameca, on the Isthmus of Tehuantepec, a light-emitting beetle that was described by the donor as a bug with two round spots on its back that gave a sufficiently powerful light to enable a person to distinguish objects in a dark room and to read small print at a distance of six inches. This strange insect served not only as a sort of public utility, but it played an important rôle on festive occasions. The native women, when they engaged in the fandango, their national dance, which they had twice a week throughout the year, fastened the shining captives in their hair and headdress. Sometimes they made garlands of them. Dressed gayly and resplendent in their jewelry, which appeared to advantage in the beautiful bluish-white light emitted by the beetles, these women, so the historian says, could readily be mistaken for fairies.

Beetles were used by the Indians of Mexico. Just a few were ample to light a whole room. At night the insects played the part of "footlights," for it was the practice to wear one on each foot. This enabled the wearer to find his way in the darkness and also to avoid snakes. The Indians caught and sold the beetles for a few cents a dozen to Mexican ladies who, with pardonable vanity, put them into transparent bags and wore them in their hair and at their necks.

It is said that in Japan social festivities are not complete unless fireflies are in evidence. Whether one attends a private garden party given by a nobleman or goes to an ordinary tea garden, he finds that fireflies are a part of the entertainment



ONE WAY TO LIGHT THE WAY

A common gourd with perforations and crude door to admit the light-giving insects

offered. Sometimes they are kept in cages; at other times they are released in great numbers in the presence of guests.

Catching fireflies is a sport in Japan. Little girls pursue them with their fans, whereas boys try to capture them with wands to which a wisp of yarn is fastened. While engaged in this sport they sing old folk songs. The grown-ups, forced to remember their age and their dignity, take a less active part. They organize parties that visit certain spots where they watch countless fireflies swarm, a beautiful spectacle.

Because of the great demand for fireflies, the Japanese actually make it a business as well as a sport to catch the insects. The fact is that there is a number of firms in that country that employ men as firefly catchers. The work of these men begins about sunset. Their equipment consists of a bamboo pole, a bag of mosquito netting, and an apron. On reaching a suitable grove of willows near water, the skillful hunter strikes the branches of a tree with his long pole. When the insects fall to the ground he gathers them up quickly. In order to save time and get them before they recover sufficiently to fly away, he uses both hands to pick them up and tosses them lightly into his apron, where he holds them unharmed until there are so many that a transfer to the mosquito bag is necessary.

This is his method of working until about two o'clock in the morning, at which time the fireflies leave the trees for the dewy soil. He then brushes the surface of the ground with a very light broom. This causes the insects to emit light and disclose their whereabouts. The "hunter" then picks them up. A skilled man can catch as many as three thousand in a single night.

In these days of marvelous lighting facilities, even coal oil lamps seem antiquated to many of us, even though they are used in tens of thousands of homes in America at present. No wonder, then, that it is difficult for us to picture people using such crude devices as those mentioned, to offset the inconveniences, the disadvantages and the dangers that follow the sunset.

WHEN IS A TOAD NOT A TOAD?

BY DORIS M. COCHRAN

THUS the old riddle might readily be paraphrased, and answered with—"when it is a lizard!" This reply is entirely applicable to the horned lizard, for this creature has been called "horned toad" so long and so often that we nearly forget what it really is.

THE HORNED LIZARD SUNS HIMSELF

Resembling his amphibian name-sakes in many particulars, nevertheless he is a true reptile

A true toad is an amphibian, by which we mean that it spends the first part of its existence in the water, where it hatches from the egg to undergo a tadpole stage. The remainder of its life it passes on land, either on the surface searching for food or, during very hot or cold weather, buried deep in the ground. It resorts to the water again at breeding time to produce eggs and start the cycle all over again.

The horned lizard, as we must really call our spiny friend, is a reptile, and differs in many ways from a true toad. Some species lay eggs, while others produce living young, which can run about in the sand and fend for themselves from the time of their birth.

A baby horned lizard is in most respects the image of its parents, except that it is smaller and not quite so spiny and roughened in appearance. A toad baby on the contrary is a rotund black pollywog which in its early infancy has no sign of legs, but only a large rudder-like tail by which to propel itself; moreover, it breathes oxygen from the water as a fish does, and at this stage would die at once if left exposed to the air.

Among so many unlikenesses, we find nevertheless a certain similarity between this "toad" and true toads in food habits during adult life. In their natural surroundings, as well as in captivity, both are insect-eaters. A plump, juicy cockroach or an enticing mealworm will awaken a gleam of desire in the eye of either, and it is a question as to which is quick enough to grab the prize. The toad eats other things besides insects—he is seen at his best, perhaps, when battling with a huge and slippery angleworm, a delicacy which the horned lizard seems to scorn. The lizard, on the other hand, is a star performer when placed on an ant hill, or beside one of the numerous ant boulevards which can be found by the dozens along the edges of a path in any city park. Here the ants go by in single file, and when the horned lizard gets well warmed up to his work, he never misses one, the licking of his lips after each diminutive mouthful being his only relaxation in business-like activity.

When being kept as a pet, the toad needs a screened box half-filled with moist earth and bits of bark, under which he can retire on hot or cold days or after he has eaten to repletion. The horned lizard needs some moisture, truly, but for a bed covering, he wants six inches of dry sand, into which he will dive head-first at the earliest approach of dusk, disappearing completely from view in two seconds' time, not to reappear again until the following morning when the sun has warmed the air sufficiently to suit reptilian requirements.

THE YOUNG BIRDS OF THE HAMMERHEAD GREW QUITE FAST

Below is the miscellaneous nest in which they hatched and which the parent birds adorned with a variety of refuse

TEGWANE, BIRD OF EVIL OMEN

BY RAYMOND B. COWLES

PHOTOGRAPHS BY THE AUTHOR

THE LONG warm day was coming to a close. Over the river wraiths of mist began to rise, and the air along the water-course felt dank and chill. The higher hills, still touched by the sun, glowed with color reflected from the tints of sunset. The flat-topped thorn-trees and cactus-like shapes of the giant euphorbias cast long and exaggerated shadows down into the valley below. Only the squat, South African *bush* showed no color, but looked black and uninviting. It was wintertime in Natal.

The bush clung close to the river or grew in clumps where moisture seeped through ledges of the cliffs rising from the waters' edge. Although it looked forbidding, it was there

that the birds were singing their evening songs, and the monkeys called in long querulous tremolo, or shouted at each other from the tree tops where they sat sunning themselves, their white chests catching the last rays of light and shining like dress shirts against the sombre darkness of their background.

The world seemed at peace. There were no sharp calls of alarm. The hawks had declared a temporary truce and the owls had not yet started on their evening hunts. Even the quarrelsome Drongo shrikes were quietly preening on the bare, dead branches of a wild fig tree. Into this quiet interlude however, there suddenly broke a wild clanging call that echoed

TEGWANE ATOP ITS NEST

A dull brown bird about the size of the raven, it is feared and respected as a bird of ill omen

up and down the cliffs along the river and stopped as suddenly as it had started. It was the call of the hammerhead "stork", and at the head of a silvery pool it stood quietly gazing down into water that mirrored in black on silver the dull-brown motionless form.

For several minutes the bird made no move except to turn its head from side to side as though studying its reflection. Then apparently dissatisfied with the spot as a fishing place it walked up the bank with an awkward strutting gait. It stopped to preen and rearrange a few feathers, then, looking up, it suddenly showed interest and once more gave forth its wild clanging cry, greetings to a second member of its race.

Both birds loitered on the bank in the gathering dusk, soon only indistinct brown shadows in the darkness. Suddenly one of the birds, as if at last deciding to do some work, reached down, picked up a six-inch length of driftwood, and flew directly to the top of a mass of debris seemingly entangled in the fork of a large thorn-tree that leaned out over the river.

The second bird followed, and as the first dropped its stick, both birds commenced to clamor loudly. For a few minutes both flapped their wings and bowed and minced about in antics entirely unexpected in so homely and decorous a bird. It was the courtship dance, not often seen because usually performed late in the day or early in the morning. It sometimes takes place during the bright daytime because I have heard the same excited clamoring then.

After the brief courtship performance had been completed, both birds proceeded to rearrange the sticks on which they stood, picking them up at random and dropping them again without apparent meaning or order. Finally one of the birds took wing, flew directly away from the tree, then turned back and darted downward to swoop sharply up and seemingly dive into the middle of the pile of driftwood. The secret was out. Although it was a pile of driftwood, it was not there by chance. No summer freshets or floods could have drifted such a mass of material into place so firmly. Each stick, reed, or ancient corncob had been tucked in place, and, together, a pair of birds about the size of ravens had stacked up

TEGWANE IN SILHOUETTE

Known as the hammerhead stork it is not a stork and goes by the Latin name of Scopus umbretta bannermani

those bushels of rubbish. The nest measured twelve feet in circumference, horizontally and vertically, and it was so strong that a heavy man could walk back and forth across it with no danger of doing damage.

The bird that had entered plunged into a round tunnel leading up to the center of the pile of sticks. It then crawled forward into a chamber just large enough to permit it to stand erect and move about upon its "knees". The inner surface showed care in construction. The sides and bottom of the nest, composed of sticks and twigs, were nicely made, smoothed off and chinked with mud and other debris. There were three white eggs streaked with mud and partly trodden into the floor. In fact they looked as though they might have been there far too long to be meddled with in safety.

By now the silvery western sky was making a perfect backdrop for the weird silhouette of the great thorn-tree. The branches, sparsely covered with folded leaves, held in their embrace the immense pile of the nest, and outlined against the sky stood a motionless bird, jet black against a fading sunset.

Next morning we went down to the nest once more, this time photographically minded. The Zulu who went along to cut a path and help in setting up the blind was cheerful as only a Zulu can be. He strode along the game path as though he knew of no such thing as fear, but from a bend in the stream he sighted the nest ahead and halted abruptly.

"We had better cross here and follow the other bank," he said.

"Why?" I demanded.

"Do you see that nest up there? That is the nest of U Tegwane, a witch," he replied.

"But that is only the nest of a bird," I said.

"No, the one who made that is no bird, he is more than that. Just see for yourself, he sits by the river at night and looks at his reflection in the water and says, 'How beautiful I am. How very beautiful I am.' And then he flies about at dusk and makes mischief. We must not go near that nest."

No amount of persuasion or offer of rewards could induce the man to go closer, so he sat down firmly.

BARN OWLS TAKE OVER THE FORMER NESTS OF TEGWANE

This is a common occurrence and probably explains the building of new nests by the hammerhead "storks"

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WEAVER BIRDS BEGAN TO BUILD THEIR NEW NESTS

In a few days these intricately-woven homes festooned the tree in which the blind was set

"If you must go to the nest, go, but I turn my back on you, and whatever happens I am not to blame," he asserted.

Then the tales of superstitions poured forth in a steady flow of clucking and guttural talk. According to some of the native tribes, to kill one of these birds brings death and destruction to the village of the individual so foolish as to have killed it. If only one bird of this species flies about a village it is a certain omen of coming death. Touching the nest is sure to bring illness to at least one person and possibly more, but to destroy the nest or touch the eggs brings penalties too awful to mention. In almost all the tales, this bird is connected with dire floods, lightning and violent storms.

With such a reputation it is not surprising that the hammerhead is left unmolested in a country where almost every bird is considered lawful game. And it was quite natural that the old Zulu refused to watch me, a white man, destroy himself.

In spite of these dire predictions I climbed the tree, and, true to his word, the old Zulu refused to help and refused to look. At last, hearing me at work examining the nest, he expressed his disgust with a clucking grunt, rose, and stalked silently off into the bush and up the hill.

The birds left the vicinity of the nest silently. They indicated no alarm or displeasure even though the complement of eggs had been laid and were being incubated. There was never any display of emotion, even later when the young were nearly ready to leave the nest. It seems probable that complete freedom from molestation has allowed a feeling of security to develop, so that even the presence of man causes no flurry of excitement as is the case with most birds. Monkeys were never observed near one of the nests and it seems altogether likely that they do not rob them. As it turned out later there is probably a basis for some of the native superstitions, especially in regard to the occurrence of disease following any tampering with the nest.

The photographic blind was at first set up on an old deserted nest not far from the new one, but this had such a horde of insect inhabitants that for comfort's sake the nest was removed and a seat made of more comfortable material. This old nest had been used by at least one pair of barn owls, a common occurrence, and this habit of usurpation by the owls may explain the building of new nests, as well as the presence of many deserted nests found elsewhere.

After we had established the blind, a flock of weaverbirds gathered in the tree, and in a few days it was festooned with nests in all stages of construction. The long periods of waiting were enlivened by intimate views of domesticity, squabbles, supercilious inspecting of the new domicile by supposedly prospective weaver wives, and frantic hours of work by the males. They worked for days, building their beautifully woven pendant nests made of fine ribbons stripped (Continued on page 66)

RAVEN—*Corvus corax sinuatus*

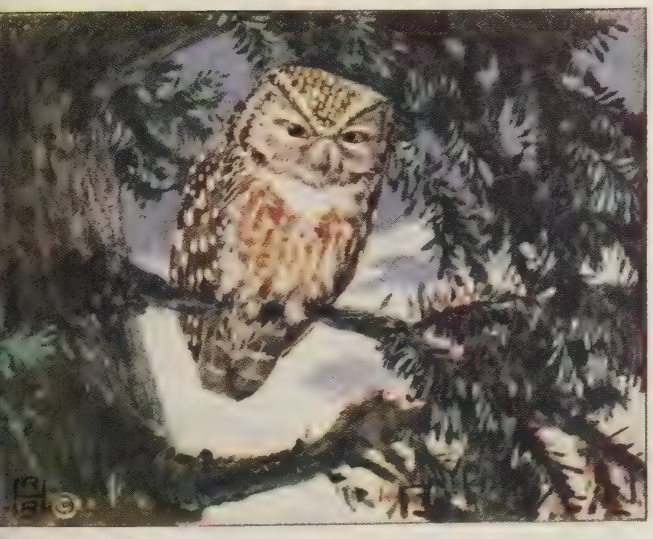
RAVEN

The raven is one of our oldest known, cleverest and most intelligent bird. Mention of him and his habits appears in the earliest writings, for he is of world-wide distribution in the northern hemisphere. Unluckily, his fondness for food which man also favors has brought him ill repute and persecution. Hence his numbers have decreased and his range is limited to more inaccessible regions. Three species are found in the United States, with general characteristics in common. The White-necked raven chooses the lower country of southwestern North America, while the Northwest Raven inhabits Canada and enters our northern states, following the mountains of the east to North Carolina. The American Raven, slightly smaller than the latter, lives on the west coast south to northern Central America. Their bulky nests, made of interwoven sticks lined with moss, cattle hair and other soft material, are placed in tops of trees or among crags in mountain canyons. The five to seven eggs are bluish-green, densely marked with brown and lavender. Food varies from carrion to mussels, insects and grain.

PIGEON HAWK

This hawk is nearly the same size as the Sparrow Hawk, but is distinguished by the difference in color. They are distributed over North America to northern South America, and nest in the upland regions from Alaska south in the mountains through Oregon to the Gulf of Mexico, and eastward to Michigan and Maine. They spend the winter from California and the Gulf States south through the Islands and Mexico to Ecuador and Venezuela. They build bulky, moss, grass and feather-lined nests in the branches of trees or place their four or five thinly spotted white eggs, with only scant protection, on a rock ledge. Probably both birds share the incubation for about three weeks. The young have yellowish downy coats. These falcons are naturally birds of the forests, but during migration they hunt on the sea shore and in the open meadows along rivers, where they feed on small rodents, insects and small birds, which they discover by watching from a chosen perch, and either pounce on at once or hector until tired. When birds or small animals are scarce, many destructive insect pests are eaten by these hawks.

PIGEON HAWK—*Falco columbarius*



RICHARDSON'S OWL—*Cryptoglaux funerea richardsoni*

RICHARDSON'S OWL

This, one of our smaller owls, is nocturnal in its habits and seems to be unable to see well in the sunlight. For this reason it has been possible to capture them easily during the daytime. It is said the Eskimos call it "The blind one." They are dwellers in coniferous forests of the far northern parts of North America, where they use hollows in trees for nests. Their two to seven eggs, characteristically unspotted white, are laid during May and June. Small rodents and insects active at night are their usual food. They migrate to the southward in winter, coming well into the states along the northern border of the United States and as far as Colorado, Illinois, Pennsylvania and southern New England. When their food supply of mice fails in the northland, these birds are known to come in greater numbers in search of sustenance. Under these conditions they even venture about farmyards, but, as a rule, they spend their time in the deep forests and are not commonly seen. Their notes remind one of those of the Acadian owl, but are much sweeter and more varied, and are in some respects the most pleasing of all owl voices.

California Condor—*Gymnogyps californianus*

GOLDEN EAGLE

The golden eagle is found over most of North America, though much more commonly in the north and west. It is found also in the Old World, ranging south to North Africa and the Himalayas in Asia. It is more commonly a bird of the interior, choosing mountains for its home. It builds its nesting platform of sticks and straw in the tops of tall trees or on some inaccessible rocky ledge. The chief food is ground squirrels, prairie dogs, rabbits and other small mammals. These it catches by swooping swiftly down upon them. The eagles often hunt in pairs. There are usually two white eggs which are sometimes marked with blotches of brown. These are incubated for about a month and the young eaglets are covered with white down. It is almost three months more before they are fully feathered and able to soar out from the home nest to join the hunt with their elders. The immature golden eagle differs from the young bald eagle in having legs feathered down to the toes, and thus can always be identified, whereas in other respects they are much alike. Eagles have ever been irresistible targets for the rifleman.

Turkey Vulture—*Cathartes aura septentrionalis*

CONDOR

The California condor is the largest bird that flies in North America, and was once quite abundant in the coastal regions of California and Oregon and southward into Mexico. They are birds that mate for life, and when one of the pair meets with death, either from natural causes or due to man's intervention, there is one more lone bird. Some years ago ranchers put out poisoned meat to kill off coyotes. This was taken by the condors and the species neared extinction. Now there are very few left and probably most of them are mateless birds. The nesting place is usually quite inaccessible, either on the bare floor of a cave-like recess high up among the rocks or in the hollow top of a stump many feet tall. There are one or two eggs, more often one, so the increase has been insufficient to keep the race alive. The young are covered with white down and have yellow bills. When they are feathered they are covered with sooty gray, and the neck and bill are black. There have been several of these birds in Zoological Parks in various parts of the country. They are gentle birds and solicitous parents.

Golden Eagle—*Aquila chrysaetos*

TURKEY VULTURE

Turkey vultures when in flight are among the most graceful birds. Their flight seems so effortless and their widespread wings and long, rounded tails make lovely silhouettes as they soar about for hours at a time. Should a bird spy food below he would drop instantly, to be followed by one and another until all the vultures in the neighborhood were collected for a feast. They are scavengers and useful in keeping the ground clear of animal refuse. They are not so numerous in some parts of their range as formerly, because many have eaten poisoned meat put out for predatory animals. They breed throughout most of the Americas from southern Canada to Patagonia. No nest is made, the two brown and lavender blotched white eggs being laid on the ground in some secluded spot among cliffs or in the deep woods. Hollow logs are favorite sites. Only the female sits on them. If disturbed she unconcernedly leaves for a few hours. The young have grayish neck and white down on the body. They are fed by regurgitation These birds fly and feed together and roost in some favored tree or grove at night.

GYRFALCON

Gyrfalcons are birds of the arctic regions, one phase being nearly white, with markings similar to those of the snowy owl, from which it may be distinguished by its characteristic hawk shape. Individual variation is so great that there is no clear way of separating the species in the field. They nest on ledges of rocky cliffs near the seacoast. The four creamy eggs, heavily marked with reddish-brown, are laid early in June. They are brooded almost entirely by the female. They breed probably to tree limit in arctic North America, and the white phase in Greenland and arctic Asia. They move southward in winter to southern Canada and the northern tier of states in the United States. They are voracious creatures, taking large numbers of sea birds which they swallow after removing head and wings. When the digestible parts have been absorbed, the rest is disgorged. They also feed on lemmings, ptarmigan and northern hares. Their rarity makes their depredations of no moment to man. These are among the birds trained to hunt for their masters in the old days when falconry was a popular sport.

GYRFALCON—*Falco rusticolus gyrfalco*

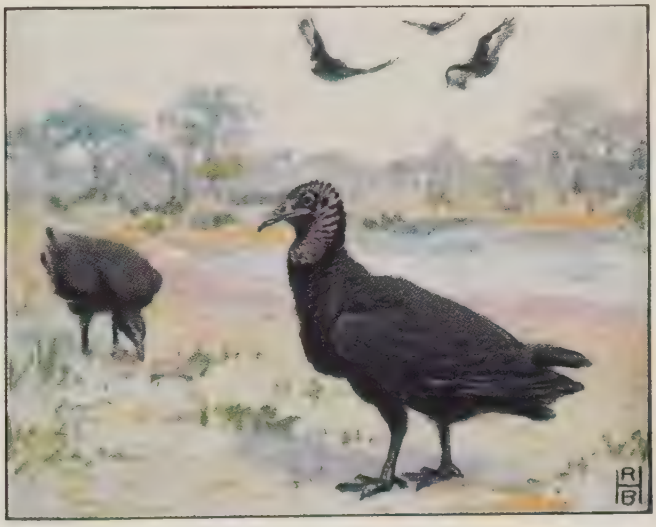
BALD EAGLE—*Haliaeetus leucocephalus*

BALD EAGLE

This eagle, the emblem of the United States, is a master of the air, flying on sure, strong wings far beyond the vision of man. Soaring majestically overhead, its sharp eyes may spy fish or other food far below. At once it starts on a long diagonal dive; and seldom misses its prey, which it carries to some tree-top to devour. Bald eagles are found all over North America and breed throughout their range. They usually nest in wooded regions near large bodies of water, and commonly place their broad, flat nests in the tops of very tall trees, though sometimes on mountain cliffs. These are large affairs made of sticks and repaired for use year after year. The white eggs may number one to four. Most frequently there are two young. These children do not get their white feathers until their fourth year. Bald eagles are much less common than formerly, due to unwarranted killing throughout their range, and especially on our western coast. They follow the fish as they gather and ascend the rivers to spawn—alewives in the east and salmon in the west. Fish not considered edible by man, are the usual prey of eagles.

BLACK VULTURE

When seen in flight this vulture may be distinguished from the turkey vulture by its smaller size, heavier flight and the shorter, square tail. If it is near enough to see the white under-wing feathers, they are a final identifying feature. It is a useful scavenger, and is protected throughout its range in the warmer southern portions of the United States, from Texas to Virginia and Florida. Vultures are found from Mexico to southern South America. Swampy, lowland areas along rivers or near the sea are chosen as nesting sites. No real nest is made. The two chocolate-marked greenish eggs are laid on the ground in the shelter of a log or some low growth. Both birds share in incubation, which extends over approximately a month. The babies are covered with buffy down, and there is but one brood each year. While raising their family these birds are shy, but when this is accomplished, they move into the southern cities, become fearless and congregate in flocks much as pigeons do in the city parks of the north. They form a most efficient street cleaning squad, as all refuse is relished by them.



BLACK VULTURE—*Catharista urubu*

CROW

The crow is one bird that everyone knows, either by acquaintance or by hearsay. He has been the standard of blackness for centuries. His self-assurance and fearlessness surpass that of any of our birds. Though he takes insects with his vegetables, his fondness for sprouting corn often outweighs his good deeds. He is a noisy fellow who repeats his characteristic "Caw" as he goes about hunting for food. There is always a lookout perched on a high vantage point to keep his tribe informed of any impending interference with their feast. Not that a crow is afraid—just cautious. He builds a large, bulky nest of sticks lined with grasses and grapevine bark, far up in a tall tree. There are from four to six bluish or greenish eggs, sometimes unmarked, but usually spotted with brown. The youngsters live up to the family tradition in the matter of racket. In the early autumn twilight great flocks come together from their scattered feeding grounds to spend the night in a chosen "roost" and talk over the happenings of the day. These great gatherings are most common in our middle states, but some winter farther north.

Crow—*Corvus brachyrhynchos*

Prairie Falcon—*Falco mexicanus*

PRAIRIE FALCON

This is a bird of the prairie and desert regions, from Canada to Lower California and Mexico, where it ranges over sage brush and canyons. It is occasionally found as far east as Illinois and Minnesota. Sometimes it builds a grass-lined nest of sticks in a tree hollow, but commonly uses a cleft on the side of an inaccessible cliff or stream bank where only a few feathers serve as nesting material. Here the two to five creamy eggs, with irregular, red-brown spots, are laid during the very early spring. Both birds share the duties of incubation, though the male more often brings a peace-offering to the brooding female as his share in the burdensome task. From a high perch keen eyes discover food at long distances. These birds drop swiftly upon small animals, especially ground squirrels, which they carry back to their eyrie to eat at leisure or, in summer, to feed the young. The prairie falcon belongs to that group of birds which have been trained as hunters, and among our American hawks is the one that most nearly resembles the duck hawk, the American representative of the Old World peregrine.

ELF OWL

This is the tiniest of the owls, being only six inches long when full grown. There are two color phases, the gray, which is by far the most common, and the brown, in which the feathers are snuff-colored; the markings are the same in both. The desert country from southern California to Texas and over the tableland in Mexico to Puebla, is the limited range of this interesting bird which is supposed to be only locally migratory. Its choice of nesting site is high in a giant cactus where it uses for its home a hole made by a woodpecker. The wood about these homes has become smooth and hard by the setting of the sap which oozes out when the woodpecker first makes them. Here the owl lays two to five white eggs. Elf owls are nocturnal and hunt constantly through the night for beetles and other insects to be found in the semi-desert land. They are so nearly dependent on the giant cactus that they would in all probability disappear if this tree-like species were exterminated. Unfortunately this seems imminent near settlements for, due to the limited number of trees, giant cactuses are being used for fuel.

Elf Owl—*Micropallas whitneyi*

JOHN RAY; BIRD CARVER

BY MARIE PILKINGTON

ANOTHER ARTICLE IN THE SERIES ON NATURE HOBBIES OF INTERESTING FOLKS

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JOHN RAY IN THE MIDST OF HIS COLLECTION

The bird carver of the Cathedral applying the final touches to one of his wooden birds

IN THE Vieux Carré section of New Orleans, where dwell those scantily endowed with the world's goods, stands the old cathedral of New Orleans. It is in the charge of the Oblate Fathers, whose dedication is to work among the poor. So here they have created a social center and set up a playground. Within the cathedral are the archives containing records of births, marriages and deaths for more than two centuries.

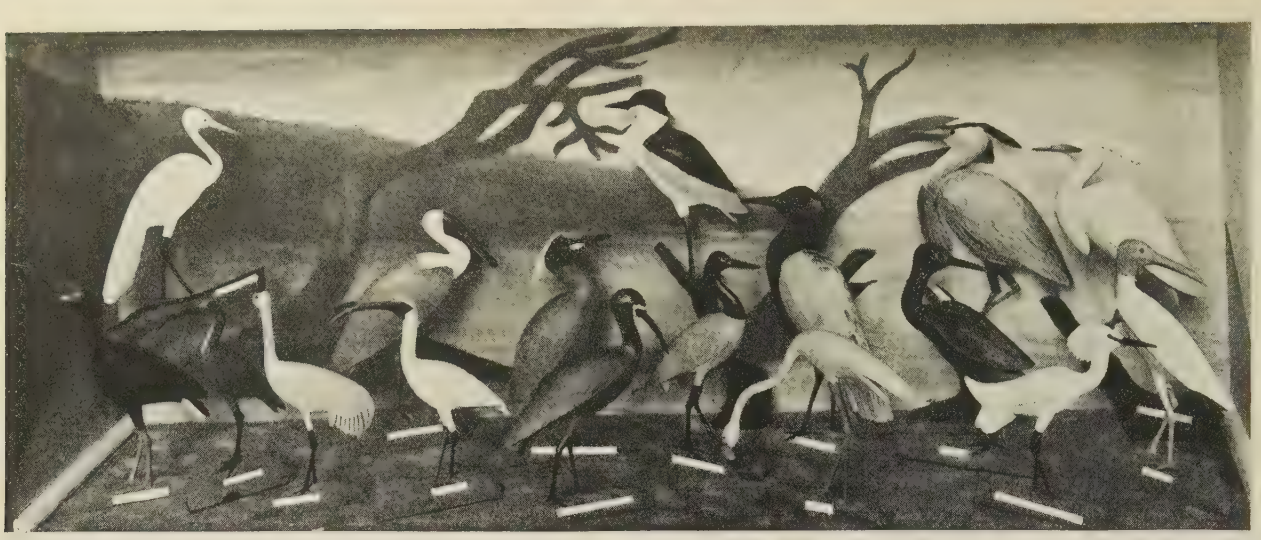
The superintendent of the community center and the keeper of these old records is John Ray. Here he guards, copies and translates these archives, be they written in Spanish, French, Latin or Italian. Here, also, he supervises the work of the social center and sees that all goes well on the playground. But one might find him sitting somewhere in this play area, surrounded by the shouts of play, hemmed in by the narrow streets and close-built houses of the Vieux Carré, carving. From the block of wood in his hand he will be fashioning a bird, and he will likely tell you that what he is doing transports him from the congested confines of the district to the wide open spaces. This is John Ray's hobby.

He is a native of Ohio, and has always cherished an inquiring love of Nature. He says that his earliest memories are entwined with roaming the countryside with a pal and observing the wild world about him. And with his love of Nature went an interest in wood carving. As a youngster he carved horses and traded them for boyish treasures. Grown up, he studied with the Oblate Fathers, but ill health stopped his studies and he turned to social work and travel, setting aside his carving tools. Finally came the opportunity to serve humanity at the old cathedral.

With this chance came also the opportunity to carry out the stifled desire to carve birds in his spare moments. With a rare and delicate touch he began transforming pieces of wood into captivating and authentic creatures. He completed a series of bird carvings and placed them in a special case with a habitat background. Urged by delighted friends to go on, he has now completed a collection of three hundred and thirteen birds representative of every group of North American bird life.

Around the walls of John Ray's room there are now several cases of his avian friends. From Nature itself, from skins and from pictures he has taken his inspiration. Each bird is first carefully studied and outlined roughly on wood. Then the rude outline is cut out with a coping saw. From then on it is a matter of a skillful knife and equally skillful painting.

His latest group of birds comprises seventeen southern marsh birds, larger than his other subjects and so delicately and gracefully fashioned that they stand erect yet sway with the least vibration. He is now at work on a



THE COLLECTION OF SEVENTEEN SOUTHERN MARSH BIRDS

These birds are wooden in material only and are so delicately done that they sway on long legs with the least vibration

collection of fishes, and forty have already been placed in a large case depicting the sea bottom.

Although John Ray's collection has been appraised at several thousand dollars he says that he is not interested in selling it. Art lacks interest for him the moment it loses spontaneity and must be produced to please another.

So John Ray, wood-carver, does his bit to aid the less fortunate of the Vieux Carré. So also he delves into the ancient records to answer some query of the court on an inheritance or some letter from afar about lineage. But when the moments offer he takes up his knife and his block of wood and carves, dreaming the while of a cottage in the country with nothing to do but to carve and observe the myriad varieties of Nature about him.

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WHERE FAT AIDED

BY R. F. CAREY

MR. TOAD STAYED JUST WHERE HE WAS, WAVING HIS FEEBLE PROTEST

A BIG splash always commands attention, but a big splash where there ought not to be any demands an investigation, and so it was on a quiet evening at Big Moose Lake in the Adirondacks this past summer. The lengthening shadows had deepened into the darkness of the woods when the splash came, revealing a comedy of frog life that was almost a tragedy for Mr. Toad, the victim in the drama.

Curiosity led me to the lake shore, not more than fifteen feet away, where I found the biggest frog that I have ever seen with the rear end of a toad sticking out of his mouth. The toad's hind legs were weakly waving a protest against being the *pièce de résistance* of Mr. Frog's evening meal. Backing off until almost submerged, apparently to get the effect of the greater resistance of the water, the frog would give a mighty jump forward and at the same time a mighty gulp but Mr. Toad stayed just where he was, waving his feeble protest. It was such a forward leap that caused the splash that made me curious. After several fruitless attempts of this kind, the toad was disgorged. Whether the glare of the flashlight had anything to do with the happy ending for the toad, I shall never know. Anyhow, he hopped off, apparently none the worse for his experience. Incidentally, that toad was very fat. I wonder what he had inside of him. Maybe it was a little frog, who can tell?

AN ORIENTAL THAT EPITOMIZES SLENDER GRACE AND FEATHERY BEAUTY

IT IS ESPECIALLY CHARMING AS A FRAME FOR A WOODLAND PATH

PHOTOGRAPH BY MRS. S. S. ESTES

BAMBOO

PLANT OF A THOUSAND USES

BY JEANETTE SPEIDEN

IF YOU were invited to lunch at the home of a friend who informed you that the principal element of the meal would be some nice bamboo, would you refuse or accept?

In America, you probably would refuse, unless you thought that the friend meant what the Chinese call "foreign bamboo", and we, asparagus. But if in China, you would probably rub your hands together in delight—for there bamboo is good to eat. In fact, the crisply tender winter shoots are real delicacies that are as eagerly sought by the foreign visitors as by the natives!

The process of harvesting the crop of winter shoots resembles mining rather than farming, thus adding a unique touch to this amazing plant. The shoots are hidden well underground, and the "prospector" examines the surface of the frozen earth for cracks that are invisible to the uninitiated. These give him a clue to the presence of a shoot.

How this queer plant happened to be tried first for food is a story deeply woven into the fabric of Chinese tradition. It was Mong Zong, the fortunate one, the story tellers say, to whom China owes a debt for another vegetable to eat with her rice. Now Mong Zong was a filial son, and to be a filial son is the chief end of man, according to the teachings of Confucius; so undoubtedly this boy was deserving of good luck. As his father was dead, he was the sole support of his mother and lived with her in a hut near the city wall. The roof was well thatched with rice straw, but the walls of bamboo strips let in the bitter winter wind. There was no fire except when the old woman was cooking rice, for fuel was scarce. Mong Zong and his mother, however, used to put on several thickwadded garments in the winter time and managed to eke out an existence in spite of poverty and cold. Then the mother fell sick. She grew very weak but could not eat the rice her son prepared for her. Mong Zong had no money with which to buy vegetables. Overcome with sorrow, he wandered out to the small bamboo grove near the hut. As he walked with downcast eyes, he noticed a network of minute cracks in the earth. Suddenly a thought struck him! It was two months before the spring shoots would appear! Filled with a new hope, he ran to borrow a spade and soon returned in triumph with fresh food for his mother. She recovered from her illness, and Mong Zong became famous both for his filial loyalty and for teaching his countrymen how to find food in the winter when it is scarce, as it too often is in China.

In China one may eat bamboo with bamboo chopsticks sitting in a bamboo chair before a bamboo table in a bamboo house. One may travel in comfort lying on a bamboo mat under a woven screen of bamboo while a boatman pushes his craft along with the aid of a bamboo pole, shouting or whistling now and then for a wind to come and fill the great bamboo sail. In the streets coolies stride by with bamboo carrying-poles supporting bamboo pails filled with water, swerving to avoid the bamboo sedan chairs in which the wealthy citizens ride. Books might be written to describe the innumerable articles made from the bamboo. It is indeed the plant of a thousand uses.

WHEN BAMBOOS SET OFF THE PEAKS

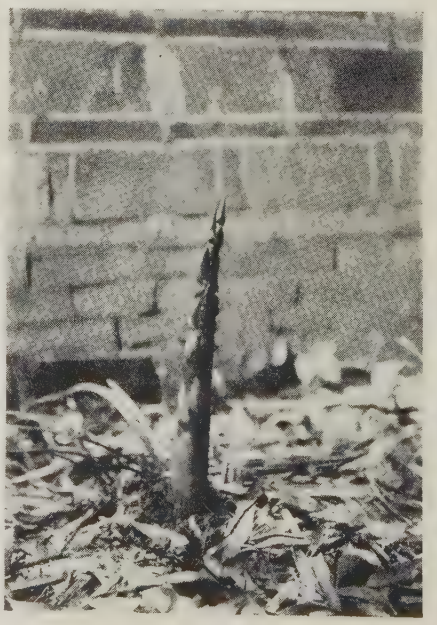
Vistas seen through bamboo groves always gain by the delicate effects created by these plants

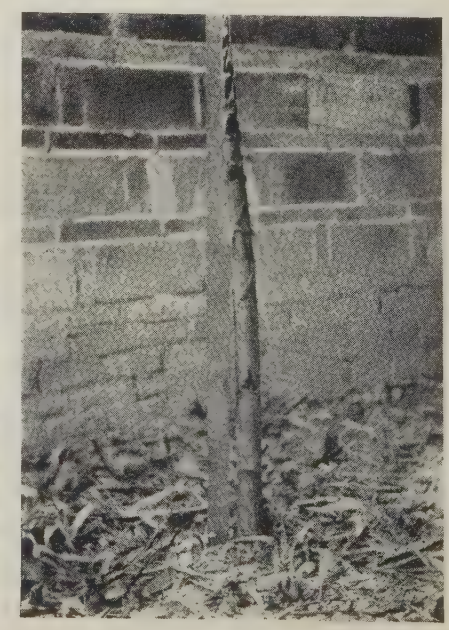
Those who know it best think not of its utility but of its beauty as a plant, and of the fascination of watching it grow! It, truly enough, is a proletariat, but in these days when the world trend is toward democracy even members of the grass family, to which it belongs, may hope to find a place in our most select garden circles. The bamboo certainly stands head and shoulders above all other grasses. Some species lift their plumes a hundred feet into the air on stems from eight to twelve inches in diameter. More than two hundred species are known. America has about seventy of them, while five grow in Africa. Bamboo is usually considered a tropical plant, for many varieties thrive best in the monsoon regions of Asia. There are a number, however, that can be successfully grown in temperate climates, even where the temperature drops to zero during the winter.

America is just beginning to discover the possibilities of bamboo as an ornamental plant. Some might object that this oriental plant would be out of harmony and out of place in a western garden. But East and West have already met and mingled in horticulture. We think of chrysanthemums, spireas, lilacs, hollyhocks and forsythia as being "one hundred percent American", because they grew in our grandmothers' gardens. Yet all of these old favorites boast of an Asiatic origin. Discriminating gardeners who have introduced the bamboo find it an ideal background for flowers, as well as a plant having a perennial charm of its own.

During the winter months when green things are at a premium the bamboo retains its leaves. Sometimes under the great weight of snow the plumes sweep the ground but they manage to raise themselves again with grass-like flexibility. After a sleet storm every leaf is encased in crystal and the touch of the sun sends millions of fragmentary rainbows flashing out. Each plant is a fountain of color. The slightest wind starts a brittle tinkling, resembling the sound of the spirit bells that hang from temple roofs.

Kuo Shi, master-artist and critic during the Sung Period in China, writes, "He that studies bamboo painting should take one bamboo branch and cast its shadow on a moonlight night upon a white wall." Japanese artists as well as Chinese have repeatedly found inspiration in the study of this plant. Hiroshigi, one of the greatest of the landscape artists of Japan, creator of many of the





best-known wood-block prints, has immortalized it in his picture of bamboos in a typhoon. Coolies running down the green hillside; chair-bearers bowing before the wind; long lines of gray rain and the slender shadowy wind-tossed stems lightly dancing before the gale!

He who would see these graceful grasses at their best must visit a mountain grove on a windy spring morning. They whirl and sway like dancers that have abandoned themselves to a frenzied rhythm. Light flashes from every smooth leaf as from a mirror until the hill seems covered with a twinkling sheen of silver. One looks through a maze of green and gray, many-jointed stems to a sheltered spot where yellow azaleas glow like "echoed sunlight" among ferns and granite boulders.

The bamboo is beautiful, too, when fogs boil up from the valleys like steam from a giant's cauldron. On such days they have the charm of "beauty half-revealed." One instant they are hidden in veils of mist, the next they stand out clearly in the rain-washed mountain air as the last shreds of fog glide away through their branches. Every smooth stem shines as if polished; every leaf is tipped with a globule of water until a passing breeze sends a miniature shower in all directions.

AN EFFECTIVE HILLSIDE PLANTING

Bamboo, as an ornamental, is new in this country, but it has infinite possibilities

The most amazing thing about bamboo is its manner of growth. Its sprouts outdo the proverbial mushroom in the way they appear overnight and then continue to climb upward without regard for speed limits. The new spikes push their way through the clods and appear among the old culms like dozens of bayonets, well covered with dark-brown mottled sheaths. No joints are visible at first; nothing but bristling points, aggressive and ready to race with all competitors for a place in the sun. Nodes soon appear and as the stems lengthen the downy sheaths drop off, leaving the smooth green culms covered with white bloom like the bloom of a peach.

Being curious to know just how fast the shoots really grew, I appointed myself referee when the spikes appeared. Each day at noon I measured certain ones to see what progress had been made in twenty-four hours. The favorite stood close to the garden wall. When first measured it was eleven inches high. Forty-eight hours later it touched the stick at the twenty-seven inch mark. When nine days old it reached a height of seven feet, its average growth per day for six days being more than nine inches. Not until it had reached its full height, two weeks later, did the leaf sheaths appear. At this time it was at its ugly duckling stage, for the pointed sheaths reminded one of the pin feathers of young birds. The green leaves soon burst out, however, and the plant became a soft plume.

THE SULTAN OF SPEEDY GROWTH

This plant grew seven feet in nine days. The first day, as shown at the left, it was eleven inches high. Forty-eight hours later, as may be seen, it had gained sixteen inches more. At the right it is nine days old, and still without a leaf

Some species of bamboo are biennial, sending up new shoots every second year. Thus each grove has its big year and its lean year. The new shoots are the means of propagation. While a few species produce flowers each year, most bamboos bloom only at long and irregular intervals. The production of seeds in these cases heralds the death of the plants. Since flowers and fruit are rarely found, classification is difficult and uncertain. A method based on the venation of the leaves is fairly

satisfactory. The varieties having leaves with veins like the meshes of a net are in general more hardy than the ones having parallel veins, though this is not a rule.

Horticultural dealers can furnish varieties suitable for planting in the United States. The plant thrives best in a rich, well-drained, loamy soil and the place selected should be somewhat protected from the wind. The underground stems, on which the new shoots have formed, should be set out before growth begins in the spring. A mulch of manure helps in conserving moisture and heat. New shoots, which appear each spring, increase the size of the grove as they spread in all directions and usually the plants increase in size and vigor as the clump becomes established in a new situation. The care and protection required during the first year or two is repaid many fold when the grove transforms its corner of the garden. The successful grower will agree with Liberty Hyde Bailey who says, "As objects of grace and beauty in the garden conservatory, and under special conditions of landscape, bamboos are matchless."

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BEAVERS TWENTY MILES FROM B'WAY

BY HIRAM BLAUVELT

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THE BEAVER HOME NEAR NEW YORK
Within a few minutes of the Great White Way. Below is a tree that has felt their teeth. Centuries have passed since beavers came so near the Big City

THE THRILL of finding wild things near civilization when most of their kind have been driven far away by it comes seldom to Nature lovers. One can easily understand the surprise of the hunters who, several years ago, bagged four moose within ten miles of Ottawa, Canada's capital; but imagine the joy of finding a large beaver colony house within twenty miles of Broadway and 42nd Street!

This discovery was made by Charles Livingston Bull, the well-known illustrator of wild-life subjects, and Irving Krump, author of juvenile stories. It is on a small running brook surrounded by marshes, just over the hill west of the old town of Oradell, N. J.

As near as the writer can discover, it is the only beaver group to be reported in this locality during the last two centuries. As a boy, I used to go fishing in and skating on a slough just off the Hackensack River which has always been called "Beaver Pond". Tradition has it, according to my great-grand-uncle, that beavers were plentiful there before the Indians were driven out. While ploughing in that field, just off the edge of "Beaver Pond", my great-grand-uncle discovered many Indian relics, arrow-heads, hammer-stones, and ax-heads and also a very unusual stone anvil. Mother used to follow the plough furrow to pick these up. The old records of New Amsterdam (New York City under the Dutch) show that the Ackkinkas-hacky Indians traded beaver pelts extensively with the Hollanders, so that the reaches of the Hackensack River must have harbored many of the animals then. But no other accounts of beaver appear from the late 1600's to the present.

The newly found creatures seem to have come to stay, having built a large hut of reeds, sticks, mud, leaves and black dirt right in the edge of the running brook where they can cruise up and down stream to feeding growths. They also have dug a canal about one foot across in a straight line up into the dry ground. They doubtless use this in going back and forth to the young birches on the higher ground.

There is little to explain how this colony came to New Jersey. Perhaps they migrated down from the Adirondacks, or perhaps from the Bear Mountain preserves where the engineers have been having considerable trouble with these persistent water workers through their building dams that the park officials do not want, or burrowing under dams where the park officials do want them. However, there they are and welcome, too.

PHOTOGRAPH BY DAVIS

LAKE JACKSON, AMONG THE RED HILLS OF NORTHERN LEON COUNTY, FLORIDA

This lovely body of water is suggestive of the beauty given to the landscape of Florida by many lakes born in geological times

FLORIDA'S GEOLOGICAL PAST

BY HERMAN GUNTER

STATE GEOLOGIST

WHILE Florida is historically the oldest settled portion of the United States, it is not upon early discovery alone that it rests its claim of interest and fascination. The fabled "Fountain of Youth" and stories of magic wealth gave it early fame among explorers, and these lures were in reality based upon tales of the large limestone springs and other physical features of the region. So it was its geology that first gave the country that is now Florida world attention, and the study of the geological making of the State is today of absorbing interest.

Perhaps one of the most general, but erroneous, conceptions about Florida is that it is entirely a low lying, sandy, monotonously level plain. True, Florida is a state of comparatively slight relief, yet there is a pleasing diversity of surface configuration ranging from the nearly level plain of the Everglades and the coastal regions to the gently rolling, hilly and somewhat dissected uplands in the interior, particularly in northern and western Florida. The range in elevation varies from sea level along the coast to more than 300 feet at certain points on the ridge running through the central part of the Peninsula and to approximately the same elevation in some of the northern and western counties. The highland area of the Peninsula has long been known as the Lake Region and more recently as the "Scenic Highlands." The topography is that common to limestone areas with sufficient elevation to permit the formation of depressions through the solution of the underlying limestone. The surface is dotted with beautiful, clear-water lakes, giving picturesqueness to the whole landscape. In northern and western Florida lakes also abound.

The most important streams of the state are the Escambia, Blackwater, Choctawhatchee, Apalachicola,

Ocklocknee, Suwannee, St. Marys, St. Johns, Hillsboro, Caloosahatchee and Peace Rivers. These main rivers have cut their channels through the more recent materials and into the Pliocene and older geological formations.

FLORIDA HAS MUCH OF INTEREST IN THE WAY OF RIVERS

Here is shown a spot at the junction of the Suwannee with the Withlacoochee near the town of Ellaville

The fact that the earliest permanent settlement in the United States was in Florida gives to the State historic age, but, geologically considered it is among the youngest. Projecting as a peninsula from the southeastern portion of the United States, Florida really stands unique, not only in its location, its climate, its diversity of soils and vegetation but also in its geology. It is included entirely within that generally well-known province designated the Coastal Plain. Deposits or formations of the same age, and quite generally similar characteristics, can be mapped from Cape Cod, Massachusetts, to the Mexican border. The prevailing character of the formations of the State are limestones, sands, marls, clays, phosphates and recent deposits of varying character. Particularly, however, in the preponderance of limestone, and the variety and extent of limey sediments of present day formation along the coast, does Florida differ markedly from other portions of the Coastal Plain. The oldest exposed formation is a limestone to which the name Ocala has been given from its typical occurrence in and near the city of that name in central peninsular Florida. As now placed in the geological time scale the Ocala is of top-most Eocene age. Thus, all the formations of which surface outcrops are known in the State fall within the youngest major geologic era, the Cenozoic, or the age of recent life. All of the epochs into which the Cenozoic is ordinarily subdivided are represented, namely, the Eocene, Oligocene, Miocene, Pliocene, Pleistocene and Recent. The deposits of marine origin were laid down in a sea of only moderate to shallow depth as is indicated by the fossil content and the character of the materials making up the different formations. Some of the deposits are of brackish and fresh-water origin; some were laid down through the action of rivers and streams, while to a lesser extent the wind has acted as an agent of deposition in some of the more recent formations.

ONE OF MANY HARD ROCK PHOSPHATE PITS

These deposits have been of important commercial value

Even though the exposed formations of Florida are all of sedimentary origin and are geologically young it is, however, known from well cuttings that the State has existed, with ups and downs, since

A BIT OF ROCKY FLORIDA COAST NOT UNLIKE NEW ENGLAND

This photograph shows an exposure of coquina at "The Rocks" south of Matanzas Inlet on the East Coast

ancient time. A well drilled to the depth of 6180 feet in Marion County, central peninsular Florida, encountered mica shist, slate, and quartzite at a depth of something more than four thousand feet. This is the first and only well from which such positive data on the thickness of the sedimentary formations in Florida have been obtained. The age of these basement or metamorphic materials has not been determined, but crystalline rocks of Paleozoic age are known in Georgia and Alabama. Apparently therefore what we now know as Florida was aeons ago a part of the land mass of old Appalachia. Since the formation of these ancient deposits now found at a depth of more than four thousand feet the State has undergone many oscillations of level, remaining dry land for ages, then covered by the sea for other periods, finally through these various vicissitudes becoming the Florida of today. The character of the later deposits, which are now fairly well known, indicates, however, that the sea in which they were laid down was never of great depth.

The Ocala limestone of Eocene age may be considered the foundation rock of Florida. It occurs at the surface over a considerable area in the central part of the peninsula and over a lesser area in western Florida. It has also been recognized in cuttings from well borings at various depths from almost every part of the State. Information thus far obtained from a study of such well samples indicates that limestones of Eocene age in peninsular Florida have a thickness of more than three thousand feet. At the time these limestones were being laid down the sea covered most, if not all, of what is now Florida as well as the southern portions of the adjacent states of Georgia and Alabama. During this period there were most likely, from time to time, islands dotting this shallow sea here and there. This is indicated by the presence of beds, or lenses, of lignite, some of which are made up largely of plant life higher than algae, within the Eocene limestones. These have been revealed by samples at different depths from wells in several portions of the State. These lignitic materials suggest a near-shore accumulation; the swamps in which they were deposited may have been protected for a period by barrier beaches which in time disappeared and permitted the return of conditions favorable to the deposition of limestone. In this comparatively shallow, warm ocean, shell and other marine life was abundant, as is evidenced by the profuse

FLORIDA'S NEWEST MINERAL INDUSTRY

A quarry of "Floridene Stone" in south Florida

THE ROLLING TO HILLY TOPOGRAPHY OF NORTHERN FLORIDA

A view of the country about four miles northeast of Talahassee, among the red hills of Leon County. One of the fine highways

and extremely well preserved fossil remains. The Ocala limestone is almost a pure calcium carbonate, white to cream colored, and prevailingly rather soft or friable. The somewhat uniform physical characteristics together with the richness of fossils—those of large as well as those of microscopic size—makes the recognition of the formation an easy task. Although predominantly an invertebrate formation the remains of an extinct whale-like mammal, *Zeuglodon* or *Basilosaurus*, have been recovered from it.

From an economic and utilitarian point of view the Ocala limestone is perhaps the most important formation in Florida. It is from this limestone that the deeper wells in every section of Florida obtain their abundant supplies of palatable water. Likewise the largest and most beautiful limestone springs in the United States are found in Florida and most of these are supplied with water from the Ocala. As highly valued as is this limestone for its water resources, it has other economic values. It is the formation from which lime was first manufactured on a commercial scale in Florida. The original quarry, opened in 1884, has been in continuous operation. In recent years the limestone has been extensively used as a road building material. Many hundreds of miles of first class highways throughout Florida have been built with it as a base.

The period of deposition of these Eocene sediments was followed by a gentle earth movement that resulted in raising a limited portion of the Eocene sea bottom forming an island or islands, while other portions remained submerged. As representative of Oligocene time in Florida there have been recognized three formations. The sediments of this period were for a time quite similar to those of the Eocene, predominately calcareous. This is particularly shown by the limestones termed the Marianna and Glendon. Toward the close of the period, however, there were evidently some slight shiftings that caused the bringing in of more sandy calcareous deposits to which the term Byram marl is assigned.

These more sandy sediments of late Oligocene time might be taken as a precursor of conditions to follow, for the Miocene of Florida is made up of considerably less pure limestone, shell and phosphatic marls, fine grained sands and clays. The physical characteristics of the several formations making up the Miocene suggest that the sea was becoming more shallow and that the shore line was not far removed. This appears to have been particularly true of the deposits of middle and upper Miocene time. That there were shiftings or slight movements within and during the period itself is borne out in a study of some of the deposits, especially the different zones in the richly fossiliferous shell marls and in the beds of fuller's earth which are separated by a sandstone stratum. Fuller's earth, as no doubt is generally known, is a variety of clay used in the filtering and refining of mineral, animal and vegetable oils and fats. In the United States it was first commercially produced in Florida in 1895. Since that year Florida has been one of the leading states of the Union in the production of this material. Phosphatic limestones of this age have very recently proven their commercial value in the production of a pleasing building stone, used most effectively for interior finishes. To this the distinctive trade name of "Floridene Stone" has been given.

In addition to the commercial value, the Miocene is also of more than ordinary scientific interest for the reason that the earliest known land mammals not only from Florida but from the eastern part of the United States

have been obtained from these deposits. These include the remains of a flesh-eating mammal related to the recent dogs and wolves, an early rhinoceros, a small camel, a miniature deer-like animal, the commonly called "giant pig", and the three-toed horse. Mention should also be made of the finding of rather complete remains of the early dugong in the deposits containing the beds of fuller's earth in Gadsden County. While the Miocene fauna is but incompletely known additional fossils are from time to time being uncovered thus helping to piece together the story of the past mammalian life of the period.

The Pliocene epoch was also one of continued shallow water or estuary type of deposition. It was during this time that the beds of phosphate, which have contributed so generously to the mineral wealth of the State, were being accumulated. The discovery of phosphate in Florida dates back to 1888. Nearly 60,000,000 tons, with a value of more than $200,000,000, have so far been produced in Florida. Also, in other areas, one of the most profusely fossiliferous shell marls in the world was being laid down, namely the Caloosahatchee, which is typically exposed along the upper part of the Caloosahatchee River in southern Florida. Shell beds of Pliocene age occur not only on the Caloosahatchee River but over a rather extended area in southern Florida as well as in the valley of the St. Johns River in the east-central portion of the State. In western Florida and through the central portion of the Peninsula materials of a different character were laid down. These were composed mostly of sand, gravel and clay; the latter including the high-grade, white-burning, sedimentary kaolin deposits, these being of particular economic value. These were evidently accumulated as river, beach or perhaps delta deposits.

During this period, too, the mammalian life was more abundant and widespread, many remains having been recovered in the process of mining both the hard rock phosphates of west-central Florida and the land pebble phosphates of southern Florida. These include various species of horse, the heavy-bodied rhinoceros as well as a type of rhinoceros more like the recent form, a bear-dog animal, peccary, camel, and mastodon. Of the latter special mention should be made of the early serrate-toothed, four-tusked type, having tusks in the lower as well as the upper jaws. The mastodons are old world migrants doubtless reaching America from Asia. During the Pliocene they were evidently well established in Florida as shown by the remains so far recovered.

With the ushering in of the Pleistocene, or the last geological period, when different ice sheets covered approximately the northern one-half of North America, Florida was in large part covered by a shallow sea in which, during minor oscillations, were laid down sand, shell marls, limestones and swamp deposits, which are encountered today along the East Coast, throughout the Everglades and southern Florida, with lesser areas in other sections. It was in this period, too, that the Keys, or coral reefs, off the southern tip of Florida, were being built up and the white oolitic limestone, used so extensively in construction work of all kinds along the lower East Coast in the vicinity of Miami, was also being deposited. In this same yesterday of geologic time the historic coquina was but a shell sea beach until at the close of this epoch it was raised a few feet above sea level and consolidated by being cemented through natural processes, making it available for the adventurous Spaniards who, in the course of events, recognized its beauty as well as value and so built with it old Fort San Marco, now known as Fort Marion, and other structures in St. Augustine and at other points along the coast.

During the Pleistocene period animal life of Florida was particularly rich. The life of this time has been likened to the present day life of the big game region of Africa. The fossils of this period are found widely distributed and are becoming increasingly better known. In all probability the animals present in Florida today, or their immediate predecessors, lived here during the Pleistocene but there are those represented that no longer inhabit the State and others that have become extinct. Among the most spectacular of these prehistoric animals are the mammoth, mastodon, saber-tooth tiger, lion, cougar, wolf, bear, fox, camel, horse, tapir, deer, peccary, capybara, giant ground sloth, and giant tortoise-armadillo. With this Pleistocene fauna human bones and man-made implements have been found in such association as to lead some to the conclusion that they are an original part of the formation and that man was, therefore, present in Florida during the time these animals, whose remains are now found fossil, roamed here. The points at which careful investigations along these lines have been made are particularly Vero Beach and Melbourne Beach, Brevard County.

A mild earth movement of but a comparatively few feet closed the Pleistocene and brought in the Florida of today. Thus the recent period, including the present day reefs, bars, limey sediments, sand dunes, wind, lake and stream deposits and mounds, comes in for consideration. There is evidence all through the State, along the coasts and up and down the rivers, of man's habitation in years long past. The artificial mounds, composed principally of the remains of shell fish, give mute evidence of a vanished race or races. The Indians, and perhaps a race preceding them, have known of Florida for ages. One of the most significant of these landmarks is Turtle Mound on the East Coast a few miles south and east of New Smyrna, standing some fifty feet above the plain and composed almost entirely of shell. Others are those at Caxambas on the southwestern coast, Collier County, and on Crystal River, Citrus County. These are mentioned for the reason that they are among the more prominent but almost in every part of Florida there are to be found these sentinels of the past. The ruins of various Missions, some of which tell of tragic events, others bearing happier records, still remain though battered through the ravages of time, to constantly remind those of the present that (Continued on page 64)

WHITTIER'S TREE

BENEATH IT THE POET WROTE HIS LAYS

BY EDWARD A. PREBLE

IN THE beautiful Bearcamp Intervale in Ossipee, New Hampshire, stands an ancient sugar maple, one of a double row of majestic giants, beneath which, local tradition asserts, the beloved Whittier used to sit as he wrote the songs that will never die so long as our people cherish the charm of the old Granite State. The tree itself lost the upper part of its lofty trunk many years ago, but its massive bole and the three great branches it still supports make it notable even among the stately company surrounding it.

At first sight it is difficult to understand the poet's preference for this particular tree above its fellows, but when one pauses in its scanty shade, and turns to see what the prospect offers, the reason for its selection is plain. To the north, past Chocorua's trident peak, rises majestic Washington, chief of the White Hills. To the southeast stands the monadnock Green Mountain, flanked about by its pine barrens and the sandy eskers that mark the footprints of the great ice mass that once gouged the broad valley. To the west rises the low steep-sided hill that friends of the master word-painter of New Hampshire's charms have honored with his name. Close by flows the gentle amber-hued Bearcamp, whose age-long meanderings have carved and levelled the whole broad valley itself. So it seems fitting and natural that he who so loved mountain and mountain-born water should choose the one spot in the neighborhood that best reveals these marvelous features of Nature.

In this peaceful valley the good poet spent many a summer of his closing years. Here he composed several lays that record with singular fidelity the beauty of the surroundings.

Almost certainly it was while resting beneath this time-scarred tree that he wrote "Sunset on the Bearcamp," which begins:

"A gold fringe on the purpling hem
Of hills the river runs,
As down its long, green valley falls
The last of summer's suns."

* * *

"Touched by a light that hath no name,
A glory never sung,
Aloft on sky and mountain wall
Are God's great pictures hung."

In this poem, as nowhere else, Whittier seems to have expressed the rapture that he felt while viewing the changes that came with the gradual lowering of the sun. Then, in the slow but certain withdrawal of the light he must needs note the premonition of his own impending fate—the certainty that ere long he must leave those well-loved scenes, but that for others the glowing sunsets and the flowers would shine, and the ever-lasting river would still ripple seaward over its sandy bed. But still:

"A lover's claim is mine on all
I see to have and hold."

And so he left in undying words his interpretation of the beauty of hill and stream, the charm of which is felt by many, but can be expressed by few. And as we pause, toward the close of a summer's day, beneath Whittier's mighty maple, and reflect on the littleness of the life of man, as viewed beside these marvels of the Infinite, we realize with the poet that "Beauty seen is never lost; God's colors all are fast." And we are grateful beyond words to the one who so loved these scenes that to him was given the genius to reveal to all the world, and for all time, the deeper meanings of their spell that never seems to pass.

THE ANCIENT SUGAR MAPLE
Under its shade the poet wrote of the beauties of mountain and stream

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The first of four articles by Arthur Newton Pack based upon last summer's Alaskan wild life photographing expedition of the American Nature Association will appear in the February issue of Nature Magazine. The first of this series tells of adventures filming the big brown bears and grizzlies in their native habitat on Admiralty Island. The article is illustrated with enlargements from the remarkable motion pictures obtained by Mr. Pack and Mr. Finley.

LOST? STRAYED? STOLEN?

WHAT HAS BECOME OF SOME RARE BIRDS AND FLOWERS?

BY ETHEL I. MASON

• • •

IF THE world of science ran a daily paper, one of the most fascinating features in it might be a "Lost and Found" column in which the naturalists of every country would list their missing rarities. Perhaps the names of many of the greatest travelers and explorers of the day would appear there, as these argonauts and mariners set forth for distant lands and seas.

Thus, instead of advertising for a missing watch or diamond ring, contributors might inquire for the whereabouts of some lovely flower last seen in the mountains of South Carolina. Or, perhaps, some great scientific institution, like the British Museum, might insert a conspicuous notice after a tremendous storm at sea, "Please notify our Curator if large and complete sea devil is found on beach. Handsome reward if in good condition."

CONUS GLORIA-MARIS
Elusive and beautiful mollusk worth $600 a specimen

There are other rarities that the scientists have been interested in, for many years. One of these was a small warbler known as the "Aurora" or eoa, that was thought to be a resident of the West Indies. This was a species of yellow and orange songster that had originally been noticed by Gosse in the 1830's, at Crabpond, Jamaica, and described by him in his account of the trip that appeared several years later. A pair of the birds were sent to the British Museum, but for many years, the question was a great problem, lately solved.

Then there were the four species of birds discovered by Audubon and Wilson at various times, dating back as far as 1812, which seem to be still among the missing, and are so listed in the files of the ornithologists with the interesting statement: "Supposed valid species . . . which have not since been met with and of which no specimens are known to exist in collections."

One of these elusive birds was *Sylvia montana,* which Wilson reported from the Blue Mountains of Pennsylvania one hundred and nineteen years ago, while a kinglet, taken by Audubon on the banks of the Schuylkill in Pennsylvania, and named by him *Regulus cuvieri* has never been duplicated. Another, *Muscicapa minuta,* or small-headed flycatcher, seems to be little more than a name and a vain hope to the searchers of to-day.

Science does not know the answer to the loss of these and similar missing rarities, and thus the little tin box that holds the sole specimen of the Townsend's bunting, is an object of great interest to the collector. This rare bird that was sent to the Smithsonian Institution bears a little red tag, on which is marked the year, 1833, and the name of John K. Townsend, who found the specimen near New Garden, Chester County, Pa., early in May of that year.

FLOWER OF THE FRANKLINIA
So far as is known it is gone from its southern forest haunts

Cotton protects the little bunting, whose bright colors have faded with the passing of almost a century, and it would seem that this bird, which is something like the black-throated bunting, but has a white throat, also resembles the English sparrow. But the latter was not imported until around 1853, twenty years after the Townsend's bunting was found. If it is a hybrid, as some have imagined, of what species is it a cross? Or is the species of which this

appears to be the only example now extinct?

It is this baffling element of mystery that so allures the amateur, as well as the expert ornithologist and botanist, in his study of Nature. It provides an almost irresistible thrill, and the mere fact that a rare species of flower or tree, salamander or bird is known to be rare or missing, at once makes it a goal for all to aim at, and thus even a short walk in the region where such prizes might reasonably hope to be located, affords an added attraction to the student and impels him to keep open and watchful his eyes.

DRAWING OF TOWNSEND'S BUNTING

Only one specimen of this bird exists and naturalists seek another

For example, an enthusiast living in certain regions of the Carolinas may gain added pleasure from his rambles when he recalls that it was here that Audubon first saw the beautiful little warbler that he named for his friend, Dr. Bachman, and which was so long a rarity.

Experts all over the country combed the forests, but upwards of sixty years had passed before it was finally located once more, and strangely enough, in two widely different sections, far from its original locality.

Perhaps the greatest gem of the entire world of missing birds might be said to be the mystery pheasant that no one has seen, as far as known, and of which practically no information seems to be available. The sole clue appears to be a portion of wing feather which was found many years ago by accident, among some loose Argus feathers in the collection of the British Museum. On investigation, this male primary wing feather appeared to be so entirely dissimilar to that of the known species that the curator had no hesitation in recognizing it as belonging to a species not yet known to science.

This feather was reddish-brown, with a band minutely dotted with white on the outer, as well as on the inner web, and the species was named by Wood, *Argus bipunctatus* to distinguish it from the well-known Argus pheasant, from the Malay Peninsula.

Nearly sixty years have passed since the naming of this pheasant, but no further details have come to hand of this bird that naturalists all over the world have wanted to find, and for which at least one notable expedition searched the most likely places in vain. Some years ago, the eminent William Beebe spent many months in the Far East, in a detailed study of the elusive pheasants which present many interesting problems, and in whose life biographies many gaps seem to be still prevalent. The explorer combed the wildest crags and forests, searched many far ranges of Central China and the Malay Peninsula, and obtained many interesting data. But the expedition returned without finding a trace of the missing *Argusianus bipunctatus,* as it is now called, and for which so many collectors have wistfully yearned.

One great rarity in the seas is the *Conus gloria-maris* or "glory of the sea", a mollusk about four or five inches long that comes from the Philippine Islands, and is

COURTESY DR. FREDERICK COVILLE

SHORTIA, BELIEVED LOST FOR MANY YEARS

It was recently found growing in the mountains of South Carolina by plant hunters who had long sought it

especially beautiful. The latest price said to have been paid for a specimen was around $600, and, according to Dr. Paul Bartsch, not one has been found in many, many years.

Plants have a peculiar faculty for slipping away from the eager naturalists who seek them, and an uncanny gift at hiding in nooks and crannies of some wall, not a stone's throw from the active hunts conducted for their special and particular benefit.

THE BLUE MOUNTAIN WARBLER

Reported by Wilson 119 years ago, Sylvia montana has since eluded ornithologists

Nature lovers will perhaps recall the excitement several years ago, on the re-discovery of a species of pink turtlehead that had been missing since Colonial days. Another species, taken by Michave in the mountains of South Carolina, in 1788, and long afterward named by Gray *Shortia galacifolia,* was not again found for nearly a hundred years, although it had been growing quietly in its mountain home all those years.

This particular species presents an attractive problem to the scientists, for it really belongs to a family of plants next that of the heaths, with a sub-arctic range in Labrador and New England. The theory is that this plant probably had a much wider distribution in past ages, for it has a close relative in Japan, but for some reason died out, and now grows in certain parts of the mountains in the South.

Incidentally the many species of northern ranging plants that were forced southward during the ice age, and were left stranded on high mountain tops here and there, afford material for many a fascinating search. Certain insects have accompanied them, and a few northern animals have left their bones as evidence of former occupation. Obviously all such studies make our geography as well as our history much more entertaining and bring to us a fuller and clearer conception of that remote past of which we hear so much and know so little.

Our interest in the Franklinia tree, for instance, is somewhat greater when we realize that it was first presented to society at Bartram's Gardens, in Philadelphia, the year previous to the signing of the Declaration of Independence. About fifteen years previous to that, John Bartram, a noted nurseryman, had discovered it on the banks of the Alatamaha River, near Fort Barrington, in the state of Georgia.

It was at first named, after a man in London, the Gordonia, but this later was changed in honor of the inventor and statesman, Benjamin Franklin. Today, plant-lovers fear that the tree is extinct in the wild forests from which it came. It does not seem to be a very long-lived species, and noted botanists have made any number of trips through the South, and combed over almost every foot of the forests from which the Franklinia is said to have been taken.

Expeditions have also examined adjacent states, but evidently our cultivated specimens in gardens and nurseries are all that remain of this American rarity of the tree

COURTESY DR. FREDERICK COVILLE

BOX HUCKLEBERRY IS ALSO ELUSIVE

It is one of the plants believed to have been distributed in glacial times and hence rarely found today

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world. One fine specimen formerly grew on the south side of Chevy Chase Circle at the District of Columbia line, but gradually drooped and appears to have died from lack of intelligent care within the last year or so, to the distress of interested residents and visitors.

Several fine specimens in Pennsylvania are more fortunate, particularly those under the control of the commissioners of Fairmount Park, and under the protection of the University of Pennsylvania in Bartram's Gardens.

This tree is, of course, a most interesting example of what is meant by a mystery in Nature, because it presents a problem to which we seem to have no answer. Somewhere, in some quiet forest of the South, there may be other specimens of this rare tree, just as somewhere there may exist any number of songsters that science has long hoped to find, and which are frankly more interesting in many respects than many of the species now common about us and of which we have the complete life story.

Mystery. Romance. Exploration. These three words all go together, and hold us fast to the world of Nature.

THE SHY ORCHIDS

REMINISCENCES OF ONE WHO LOVES THEM

BY S. S. DICKEY

THE RAGGED-FRINGED ORCHID
"It became my guide, philosopher and friend"

THERE is something thrilling in the discovery of any one of that distinctive group of wild flowers, the orchids. One associates them with certain red-letter days spent in quest of oddities in wild life that lurk in the sphagnum bogs.

The ragged-fringed orchid, *Habenaria lacera,* is one of the flowers which the inquisitive botanist is likely to search out in those remote mountain swales, where the chippering yet fascinating song of the Nashville warbler greets him amid the stands of yellow birch, aspen, and tamarack trees.

I shall not soon forget my first sight of this flower. It was a brilliant day early in July and I had gone into the glade country high up in the Alleghany Mountains of western Maryland. That area is somewhat segregated from the lowlands, which spread out for miles beyond its fertile valleys, and it presents to the naturalist a world of wonders in certain more northern or Canadian forms of life.

As I roamed among the gaunt trees, with eyes centered on certain sphagnum hummocks where I hoped to ferret out the secluded nest of mother Nashville warbler, I came face to face with a little colony of ragged-fringed orchids. To be sure, they were quite still and unobtrusive there in the wild bog, but nevertheless they presented a most thrilling spectacle. Their sparse roots seemed to penetrate the sour moss and send upward the dark green spikes whereon a host of peculiar blossoms spread wide their tattered and sallow lips.

Thereafter the ragged-fringed orchid became my guide, philosopher and friend, and once in the tamarack bogs of northwestern Pennsylvania, it led me to penetrate deep into a swampy covert where few if any human feet had ever trod before, just to renew the acquaintanceship so pleasantly begun.

This shy orchid delights in more or less shady nooks, where now and then the sunbeams glance amid the fringy sprays of the larch and the birch to add spangles of golden light to its fair delicacy. Other orchids besides this one also await the orchid-lover in similar spots. The snake-mouthed *Pogonia* is apt to seek seclusion here and it is a big day when the botanist chances upon a cheery bed of these.

That pink beauty, the *Arethusa,* has now quite vanished from the swamps that grace the landscape of my native village, and yet if I journey a long way from home, and penetrate the spruce belt in the higher, rarer atmosphere of the Alleghanies, then once in a long while, I find it—the prize among floral beauties.

Arethusa is indeed a secretive wild flower, and seeking as it does the far away mountain fastnesses, it requires expert scouting to bring it to light. Thus the forest wanderer is led in quest of it through mazes of mountain hollies, and sometimes knee deep in dark waters where the mallard duck and the northern water-thrush flush at his approach.

The orchid hunter, it might be added, does not fancy that mode of botanical research which prizes a rare plant merely for the sake of a pressed specimen. Rather, he looks hastily at the rarity, and leaves it untouched, taking as his reward only an impression that brings happy reminiscences in the dreary days of winter when he lies ensconced in his den, dreaming over the glad hours that were, and that he hopes will be again.

JANUARY WEARS THE GARNET

BY AUGUST PONDORF, JR.

IN ANCIENT times, he who was born in January and possessed its birthstone, the garnet, need never, if he believed the ancient lore, be afraid. This handsome red stone with its resplendent "fire" insured victory. More than that, it gave him grace and power, strengthened the heart and increased riches and honors. If worn about the neck, it warded off plague and lightning. Likewise it gave and preserved health, just as it drove away vain thoughts, and reconciled differences between friends. Fortunate indeed, this man who possessed the garnet, a friend and a protector.

Fortunate, too, the husband who won a maid born in January and who was rich enough to bestow a garnet on her—for, in the wisdom of the sages and the songs of the poets, no woman could wear this gem and fail in constancy:

"No gem save garnet should be worn
By her who in this month is born;
It will insure her constancy,
True friendship and fidelity."

Less credulous moderns do not find in the January birthstone such magical virtues, yet wear it fully as much as did the ancients, because of its brilliancy, warmth and charm. Just as in the past, stones of that lovely and individual shade of red known as "garnet" are most popular, although, as probably few know, there are among the garnets a multitude of varying shades of red, yellow, green, brown and black, and, in Tellemark, Norway, even white garnets have been found.

This range of colors is due to differences of chemical composition. Garnets, to the chemist, are silicates; that is, their base is silicon and oxygen, one combination of which, silicon dioxide, is common sand. To this base are joined different combinations of minerals, and each combination has its own color. For example, if the minerals are magnesium and aluminium, the gem will usually be red; if calcium and chromium, it will usually be green. There are six main groups, within all of which, however, the relative proportions of the minerals may vary: grossularite, with calcium and aluminium; pyrope, with magnesium and aluminium; almandite, an iron-aluminium garnet; spessartite, or a magnesium-aluminium combination; andradite, consisting of calcium and iron, and uvarovite, a garnet composed of calcium and chromium.

Varying fully as much as the color is the appearance of the stones. The finer red ones are transparent, and have a great deal of that elusive quality called "fire", which gives the name to the pyrope variety. Carbuncles, which are usually clear, transparent red pyropes and almandites, were so called because the red color within the stone seemed to be as animated as a glowing coal. Other stones, however, are opaque and have a resinous, or sometimes a greasy, look. Of course, the most desirable and valuable are the clear blood-red, cherry-red or violet-red gems, which may have a brilliancy that compares favorably with the sapphire. The olive to deep green stones are occasionally sold as "olivine" and "peridot", varieties of chrysolite which they resemble.

Garnets range in specific gravity (or weight compared with the weight of an equal volume of water) from 3 to 4.30. The specific gravity of the Earth is about 5.5 although the earth's crust is but 2.7. Their degrees of hardness lie between 6 and 8 on the lapidary's scale, which means that the softest will be scratched by a good file, while the hardest, uvarovite and some kinds of andradite, will abrade quartz or "rock crystal." Quite large quantities of the harder stones not suitable for gem purposes are ground for use as abrasives.

These gems are usually found in beautiful crystal forms of geometric regularity (Continued on page 62)

WHAT IS YOUR BIRTHSTONE?

Throughout all ages, gems have been considered to affect the lives of their wearers. The twelve birthstones, selected to represent the months, had, according to mythology, great powers. In each issue this year, Mr. Pondorf, gem expert and scholar, will reveal the thrilling history of the stone that marks the current month and explain its composition, source and value. We especially commend this series to you.

GEMS FOR THE JANUARY-BORN

It is not possible to catch their real beauty in black and white. Most valuable are the blood-red and violet-red stones

A FAMOUS TREE AT A FAMOUS INN IN MARYLAND

Anne Arundel Chapter, D. A. R., marks a "grandchild" of the Cambridge Elm planted at Rising Sun Inn on the road Washington traveled to Annapolis. DeCourcy W. Thom of the Maryland Bicentennial Commission was the speaker. Mrs. A. G. Cooke, regent of the chapter, is receiving the certificate of membership in the American Tree Association from R. T. Edwards

TREES FOR WASHINGTON

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN TREE ASSOCIATION

When George Washington took command of the Continental Army he did not have a united citizenry behind him. Instead of being called the United States the country was known as the Colonies. Many there were who were not in sympathy with the move for freedom. In fact, Washington, at one time, made an address to his officers on loyalty. He opened his address by saying: "Gentlemen, you will permit me to put on my spectacles, for I have not only grown gray but almost blind in the service of my country." That phrase in itself is considered a powerful rebuke to the disloyal. Looking back on those times it seems hard to realize the country was not united as it is today. The citizens of today are united in honoring him. A great country next month will begin a great bicentennial program marking the two hundredth anniversary of the birth of the founder of this republic. This program will take many forms during the year just born but no phase of the program has more of good citizenship-making and more of lasting benefit in it than the planting of millions of trees to mark the event by citizens young and old; citizens united in one common purpose, honoring Washington.

The American Tree Association, Washington, D. C., which is directing the bicentennial tree planting program and is registering all such tree plantings on a national honor roll, announces in a bicentennial year message to the tree planting army that the registrations have reached a figure exceeding the 10,000,000 tree goal set. The program will continue through 1932. The thousands who have helped in this program are the united citizens of today who have put, deep rooted in the ground, a sign of their American citizenship; a living, growing tree to be a witness to future generations, say in 2032, of that citizenship of which they are so proud. And in honoring the man who set this nation upon its feet the tree planter

has erected a memorial to himself that cannot be excelled.

But who are these citizens, some of them in the making, who are doing all this planting and will continue to do more during this bicentennial year? Maj. Maurice E. Finn can tell you about some of them at St. Labre's Mission in Montana. There are in the long list of tree planters, Peter Little Bird, Jr., James Bear Comes Out, Wilson White Wolf, Spencer Medicine Elk, Mary Whitehawk and two score others who have planted trees for George Washington. Harry G. Eby, the forester of the Welfare Department, at the Western State Penitentiary in Pennsylvania, can tell you about men in that institution who planted thirty thousand trees in a George Washington Memorial Forest. A bronze marker stands on the state highway where all may see this memorial. At the Eastern State Penitentiary a like story can be told by K. N. White, the farm manager, of what the men did there. The School for the Blind at Indianapolis has planted a memorial row for Washington. A memorial tree stands for Washington at Los Banos in the Philippines. Another, planted by President Hoover, stands in the grounds of the White House. In thousands of school yards throughout the nation are other living, growing memorials to the Father of Our Country. Each has a certificate of membership in this tree planting army. Perhaps the leading young tree planter of the country is Maurice McCarthy of Winthrop, N. Y. He has been helping his father plant ever since he could hold a seedling in place and tamp the earth around the roots. He has just added a thousand white pines to bring his total to 11,000 trees and he is only

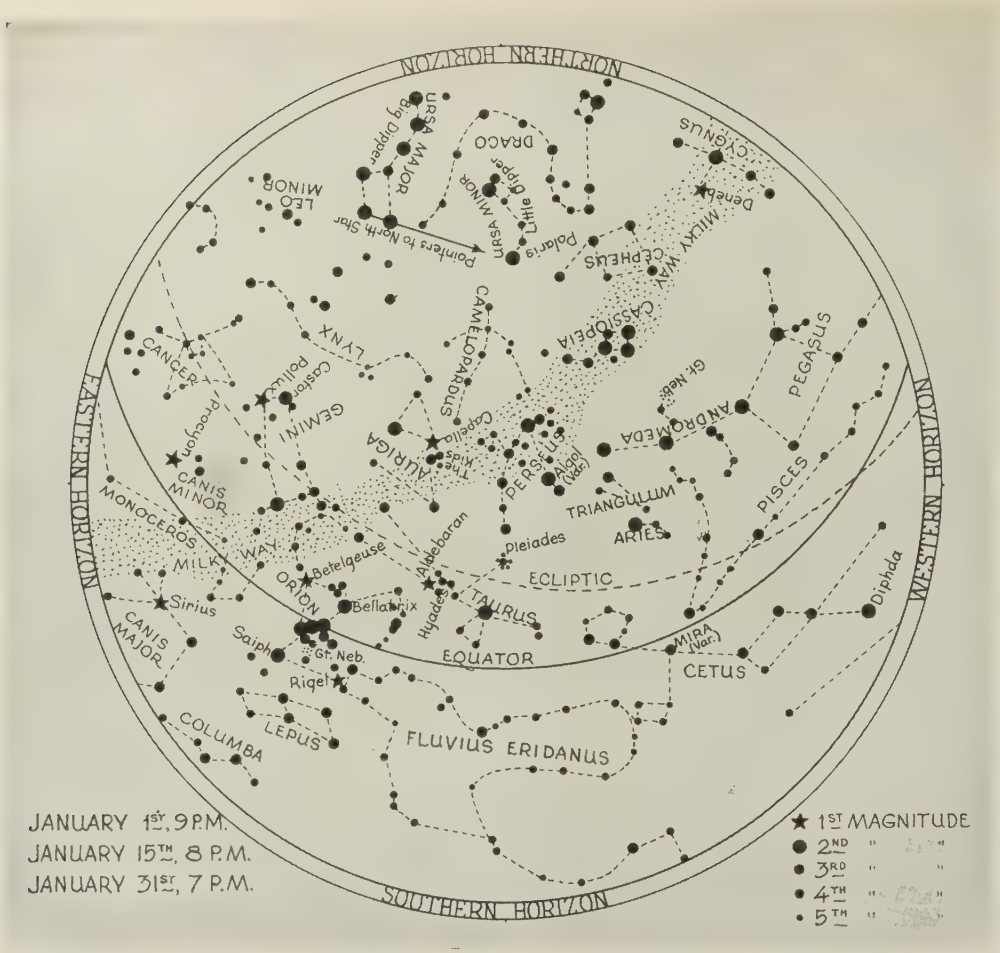
(Continued on page 62)

MARKER FOR THE TREES

This marker stands on the highway near the penitentiary and informs all who pass that the trees you see were planted by the Pennsylvania Welfare Department

THEY PLANT MEMORIAL FOREST FOR WASHINGTON

Under the direction of H. G. Eby, the forester, men in the Western State Penitentiary of Pennsylvania plant 30,000 trees. H. W. Savage, represented the American Tree Association, with other officials when the forest was dedicated



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

TOTAL SOLAR ECLIPSE

NEW ENGLAND AND CANADA IN PATH OF THIS YEAR'S EVENT

BY ISABEL M. LEWIS

WHILE making plans for your vacation this summer why not consider a trip to Maine, New Hampshire, Vermont or Massachusetts, the playground of America, to view that most impressive of all natural phenomena, a total eclipse of the sun which is scheduled to occur on the afternoon of August thirty-first? Already astronomers in this country and abroad are preparing to make extensive scientific observations of this eclipse.

The Royal Astronomical Society of Canada has arranged several tours in this country or Canada with a point in the eclipse path as the final objective. The location chosen in this country is Douglas Hill in Maine, which lies close to the center of the path of total eclipse. Although this appears to be an excellent location there are many others that promise to be fully as advantageous both in New England and in Canada. One has, in fact, nearly all of the White Mountain region to chose from, including Mt. Washington itself, and what a sight a total eclipse of the sun would be viewed from the summit of Mt. Washington! North Conway, Jackson, and Lancaster are among the most favorable points in New Hampshire. One is not restricted to the White Mountain region alone, however, because the New England coast from Casco Bay to Gloucester, or Cape Cod in the vicinity of Provincetown, offers tempting points of vantage for observing the eclipse. A strip of northern Vermont also lies within the path of totality and the country for some miles on either side of the St. Lawrence from the vicinity of Montreal to within about twenty-five miles of Quebec should afford many excellent points of observation. It is probable that scientific observers will be scattered widely along the path of total eclipse from Provincetown to as far north as possible in Canada to mini-

mize the chances of defeat by clouds. Trading posts in the Hudson Bay region also lie within the path of totality, and it is possible that observations of the eclipse may be made even that far north. Chances of fair weather in New England at the time of the total eclipse, which will be about 3:30 P.M., appear to be a little better than 50-50 in Maine and on Cape Cod, and slightly less favorable in northern New Hampshire, Vermont and Quebec.

The International Astronomical Union which holds its meetings every four years has planned to meet at Cambridge, Mass., immediately following the eclipse so there will undoubtedly be many well-known astronomers from abroad here for both events. It is still too early to say how many scientific expeditions will be in the path of totality to make observations bearing on certain important problems in Astronomy and Astrophysics that can be made only on such occasions. It is safe to say, however, that there will be a formidable battery of scientific instruments set up all along the path at the most favorable sites in New England and Quebec on eclipse day.

The United States Naval Observatory, which has sent forth many eclipse expeditions, including that extremely successful one to Tin Can Island in the Pacific in the fall of 1930, may be expected to be well represented at this eclipse though no plans have been officially announced at this early date. Undoubtedly all of the large eastern observatories and many farther west will have observers in the field because there is something about a total eclipse of the sun that draws astronomers like a magnet. An astronomer who has once experienced the fascination of beholding the weird beauty of the solar corona, which can be seen at no other time, is apt to suffer from "eclipse fever" and to develop into an eclipse chaser, journeying thousands of miles, sometimes, to satisfy this urge to see another total eclipse. The Nautical Almanac Office of the U. S. Naval Observatory, where the prediction and calculation of eclipses are made each year, has prepared a 31-page pamphlet on the subject of this eclipse with large-scale map of the region of total eclipse and this is obtainable from the Superintendent of Documents, Washington, D.C. for twenty-five cents. Information is also given concerning the times of beginning and ending of the partial phase of this eclipse and its magnitude at many points in the United States, because the phenomenon will be visible as a partial eclipse of greater or less magnitude all over North and Central America, the West Indies and the northern coast of South America.

Partial solar eclipses are of little scientific value, however, and it is only within the path of total eclipse itself, or close to it, that the observations are of more than passing interest. A large partial eclipse is always an interesting phenomenon to observe, even if of no value to science, and at most of the large cities in the east there will be an eclipse of more than nine-tenths of the sun's diameter. Boston, which lies only a few miles outside of the path, will see more than 99 percent of the sun's diameter covered by the moon. New York City which, as many of us will remember, was on the southern limit of the path of the total solar eclipse of January 24, 1925, the eclipse that was so enthusiastically observed by millions, will have a maximum partial eclipse of 95 percent and even as far south as Washington, D.C. the magnitude of the partial eclipse will be 89 percent.

A glance at the map of this eclipse published in the American Ephemeris for 1932 or the Eclipse Supplement tells us that the moon's shadow-cone will first touch the earth at sunrise in longitude approximately 109 degrees east and latitude 79½ degrees north and that it then passes in a southeasterly direction, at the tremendous speed of half a mile a second, across the polar regions to Baffin Land and Hudson Bay, thence to the province of Quebec, Vermont, New Hampshire, Maine and Massachusetts, passing off to sea at Provincetown and leaving the earth at sunset in the Atlantic Ocean in approximate longitude 41 degrees west, latitude 28½ degrees north.

The width of the path of total eclipse will be about one hundred miles and the duration of the total eclipse in New England will be about one minute and forty seconds at the most. During this brief period the astronomers must make their photographs of the solar corona, which can be seen only at that time, and all other scientific observations for which they may have journeyed many miles. The duration of this eclipse will be a little less than the average duration of a total solar eclipse which cannot at most exceed seven and one half minutes and which averages less than three minutes.

The phenomenon of most interest connected with a total solar eclipse—which can be observed before and after totality only for a few minutes—is the well-known shadow bands. These are also seen sometimes at places a few miles outside of the path of total eclipse. They were one of the most remarkable features of the eclipse of Jan. 24, 1925 showing up with great distinctness upon the background of snow. During some total eclipses they are seen very indistinctly or not at all. They are fleeting bands of light and shade and are generally explained as an effect produced by surface air currents, although this explanation is not entirely satisfactory, and it is doubtful if their cause is yet thoroughly understood. They are one of the most interesting features that precede and follow the total phase of the eclipse and always deserve attention. There are many observations of a total solar eclipse that may be made by those who are interested in astronomy even if they are not professionals and we will consider some of these in a later article.

January is one of the finest months of the year for star-gazing. Seven of the twenty brightest stars in the sky, including Sirius, the Dog-star, brightest of all the stars, are now above the horizon in the evening, and there are, in addition, many stars of the second magnitude!

Orion, which is generally considered to be the most beautiful of all the constellations, is conspicuous in the southeast. Following Orion are Sirius and Procyon, the

Dog-stars. To the northeast of Orion is Gemini, the Twins. Pollux in Gemini is one of the first magnitude stars as is also the beautiful Capella in Auriga, north of Orion. This star can be easily recognized by the presence of the group of three small stars close by. Capella means "She-goat", in Latin and the three nearby stars are Haedi, which means "The Kids."

Taurus is also one of the most beautiful constellations in the heavens. It contains the red, first magnitude star Aldebaran in the group of the Hyades, northwest of Orion. The famous group of Pleiades, to the northwest of the Hyades, is also conspicuous at this time of year. Some people with very bright eyes have claimed to have seen eleven stars in this group. There are many more than that visible telescopically in this cluster but with the naked eye six is the number that are visible to average eyesight and they are arranged in the form of a dipper.

The Milky Way is also brilliant and beautiful at this time of year, arching high across the heavens from southeast to northwest. The Winter Street, Jacob's Ladder and the Pathway of Souls are some of the names by which it is popularly known in foreign lands. It has been given numerous titles in different countries.

The planet Venus is now visible in the southwest after sunset. It far excels all other stellar objects in brightness and is visible for more than two hours after the sun has set. Jupiter is in Leo and rises about nine o'clock early in the month. Mars and Saturn are now too close to the sun to be seen. Mercury may possibly be seen before sunrise for a week or so before and after January 11, the date of its greatest western elongation. It is then far over in the southeast and difficult to find.

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ELEPHANT EAR BLOOMS

THEY ADD NEW INTEREST TO CONTEST

BY FRANCIS M. WESTON

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IN THE dramatic race to grow the largest elephant ear leaves, the elephant ear champions boasting of their exploits in the pages of NATURE MAGAZINE seem to have forgotten all about the amazing flowers these plants put forth. Perhaps, however, the omission is not due to lack of memory, for the plants seem to bloom not at all in some localities and never are profuse in their floral adornment.

I first saw their blooms on some medium sized elephant ears in Pensacola, Florida, several years ago. They were blooming for the first time in their owner's experience, and he immediately seized the opportunity to examine and photograph them. The true flower is a light yellow spadix—but not the deep, golden yellow of the calla lily—and is enclosed in an even lighter yellow erect pointed spathe. The spathes produced by these medium sized plants were no more than six or eight inches long.

After hearing of this discovery, we kept close watch on a group of fine, large plants in the garden of Ray Densmore, of Pensacola, in the hope that, if the larger plants blossomed at all, the size of the flowers would be in keeping with the great size of the leaves. The leaves, by the way, take rank with any that have been mentioned in NATURE MAGAZINE, and were exceeded in size only by those described by W. E. Sexton in the February, 1931, issue. The largest leaf measured thirty-eight by fifty-seven inches and was borne on a stalk that towered seventy-six inches from the ground to its junction with the leaf.

THE HANDSOME FLOWER

Its size varies with the size of the leaves. This particular bloom was fifteen inches high

Finally our watchfulness was rewarded by the flowering of several of the huge plants, and the size of the blossoms fully justified our expectations. A photograph of the largest is shown here. The length of the flower from the top of the ovary to the tip of the spathe was fifteen inches and the greatest diameter was four-and-one-half inches. The spadix could not be measured accurately without danger of bruising it, but it was about twelve inches long and almost an inch in diameter.

A NOBLE BEECH

BY DR. EDWARD LINCOLN DILLMAN

PHOTOGRAPHS BY FREDERICK J. WEBER

THE WEEPING BEECH IN FULL SUMMER FOLIAGE

Come winter and the leaves have gone but it is then host to a colony of night herons, which each night leave their roost to forage for food

NEAR Parsons Boulevard in Flushing, Long Island, New York, there stands a magnificent weeping beech. There it has stood for many years—just how many is a matter of debate and conjecture—and there it will continue to stand because it is owned by the City of New York and cared for by its Park Department. For a time it was threatened by a real estate development before a great city came to its rescue.

In summer this noble tree spreads its drooping branches in compact splendor. In winter its leaves are gone but from October until April it is the roost of a colony of night herons. Here the birds spend their days. When night falls, true to the habit that suggests their name, they fly off to the shores of Long Island Sound for food, but always get back to the roost by early morning. About eight years ago this heron colony numbered some forty birds. Last winter there were only twenty because foraging for food on Long Island Sound is harder and harder because of hundreds of motor boats spreading upon the waters a film of oil. The nesting place of this colony of herons has been discovered on Manhasset Bay, where the oil waste is especially bad and where it is gradually bringing about the extermination of the birds.

THE TRUNK BENEATH THE FOLIAGE

At a height of three feet from the ground it is more than nine feet around

Nothing can detract from the summer beauty of this fine tree, but when its winter tenants are no more it will have lost something of great value that cannot be brought back.

Perhaps the sentiment that saved the tree for its summer beauty may yet find a way to do away with the devastating oil, and thus help the harmless birds that add to its interest in winter.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

• • •

Woodcock Trap

New Jersey maintains a trap for migratory birds the like of which can hardly exist anywhere else on this continent. It is the Cape May Peninsula, the southern extremity of the state, where many thousands of our land migrants, pressing southward each autumn from their summer homes in our northeastern States and the Canadian Provinces, find themselves crowded as in the mouth of a funnel. Here they face for the first time in their journey a broad water traverse, the mouth of Delaware Bay, a long and at times a tempestuous crossing.

Hawks, rails, and the shorebirds, besides a large variety of smaller migrants, follow this route in great numbers. We would particularize on the woodcock, for to this vanishing bird, in its southward flight in October and November, this funnel trap is a dangerous hazard.

Cape May, with such facilities for killing woodcock, naturally has many resident hunters, and entertains many more from up-state. Not long ago some light was shed on the situation by the following conversation, held with a local jack-of-all-trades who hunts woodcock as an avocation, and reported by the visitor, who is interested in preservation of the woodcock.

"Are there many woodcock here in the fall?" the resident was asked.

"Yes, sometimes the woods are full of them."

"I suppose you kill a few sometimes."

"Yes, and get pretty good bags in some flights."

"But you can't kill more than four a day."

"There isn't any bag limit here."

"How do you manage it?"

"Well, I can shoot four and hide them in the brush or under a stump, and then if I have good luck I hide some more in another place, until I get a chance to take them all home. Then, if a game warden comes along, I never have more than the limit on me. But we don't often see a game warden down here. Anyway, when there is a flight the game warden is likely shooting woodcock himself, somewhere."

"Don't hunters from other places come here for woodcock?"

"Oh, yes, when the wind is right for a flight to come, the coast guards and the other people along the shore 'phone to their friends up-state in the evening, and next morning they are down here on the job."

To understand why Cape May Point should constitute such a hazard, one must consider various circumstances. Woodcock are night migrants and must await a time favorable for their flight across the bay. At times, therefore, they are forced to remain during the day in some numbers on this land's end. Here, then, is a notable opportunity for friends of this persecuted bird to offer special protection. But one will search in vain for any evidence of mercy being extended to Cape May woodcock. On the contrary, the helpless state of the bird is utilized to the utmost to effect its destruction. To increase its revenue the state even sells for two dollars a special woodcock license. The unusual hazard at Cape May is well known, but the state seems more willing to take advantage of the bird than to protect it.

How to Buy More Ducks

The realization that our ducks and geese have become dangerously depleted, a condition that at last has even reached the attention of those chiefly responsible, has led to many suggested remedies. Prominently advertised are several schemes sponsored by different agencies that have set themselves up as conservation bodies, which propose to restore America's waterfowl remnant by the simple process of taxing each waterfowl shooter a nominal annual fee. The several methods doubtless appear to their originators to be very different, but to us they seem essentially alike. They are all on paper. They contemplate, by the simple use of the multiplication table, the raising of huge sums of money. This money, if and when collected, is to be used to purchase and improve breeding and feeding areas, to apprehend game law violators, to increase the natural supply by artificial breeding, to negotiate further treaties, and so on.

In none of these schemes is there any suggestion that the kill should be reduced. On the contrary, it is made plain that the new schemes are born of the hardships inflicted on the hunter by regulations that limit his activities. Still, in the face of an undeniable lessening of the supply of waterfowl and, also, a corresponding increase in the number of hunters, we are asked to believe that in some magical way the birds may be so increased as to satisfy all demands, merely by the spending of money.

Are we credited with having lost our reason, or merely our memories, that we are asked to believe that, by any alchemy, magic or miracle, a dollar or two can be made to produce repeated bags of ducks for an army of slaughterers through a long season. Have we so soon forgotten the well-deserved fate of the so-called Game Refuge Bill, also based on a dollar tax and designed to buy "refuges" on which birds should be enticed and shot. And the rebukes administered to that bill's proponents, who year after year butted their heads against solid walls—are they forgotten? Do we not remember that the people have decreed that sanctuaries are to be inviolate, and not slaughter pens? If these events have been forgotten, let us ask a question. How shall the hunter's lone dollar (or his five dollars) be set to work so as to accomplish these ends: To purchase sanctuaries, when the hunter himself now holds the best feeding grounds as shooting preserves, and will not let them go; to hire wardens to apprehend violators, when most of the violators are the very ones who are to put up the dollar; to destroy predators over millions of square miles of breeding ground, when the hunter is the greatest of all predators; in short, to reproduce by any method whatever a resource that has been selfishly squandered by its supposed guardians.

Surely we are not expected to believe that a dollar or two from each hunter, or a nominal tax on the very cartridges he is to shoot at the ducks, will do any of these things. And furthermore, we doubt whether the proposers of these schemes really believe in them, themselves. Their expositions seldom have the ring of sincerity. Much of our so-called conservation activity is mere twaddle, as someone has well said. Back of a lot of it may be detected the shadowy forms of the manufacturer or dealer in apparatus for destruction. Seldom can one detect a sincere plea for the bird or animal itself. A vast and intricate system of formulas, slogans, and frequent and wordy press releases, loudly advertising the sponsoring agencies, has been built up. The latest scheme is the best. This is the age of investigation. A good long investigation may lull the mind of the public into the belief that all is well with the expiring victim.

The facts are that conservation has come to be pursued as a profession—some say that it has become a racket. But rackets cannot live long if a slumbering citizenship awakes. But it must awaken soon if our waterfowl are to be saved.

A Real Emergency

Ten million acres of unrivalled forested lakeland, embracing 3500 connecting lakes and representing one of the few remaining areas of primitive America, lie on both sides of the international boundary between Minnesota and Ontario. Here it is proposed to set up for posterity and for all of the people an area that will be at once a place of recreation, a sanctuary for birds and mammals and a forest preserve that will be administered under a uniform plan of forestry. Against this proposal is set the desire of a small group to exploit this area and its waterways for their own benefit.

This is not a new project, but the active fight has covered a period of five years. In November, 1927, the Quetico-Superior Council was formed to conduct the campaign for the preservation of this entire Rainy Lake watershed. This drive reached a climax with the passage of the Shipstead-Nolan Bill in July, 1930, placing Congress on record as opposed to the exploitation of the area. This measure by no means protects the entire area. A treaty with Canada must be negotiated and many other steps taken before the great stake that the public has in this territory and in the program may be safe.

Thus far the burden of the campaign has been carried by Minnesota citizens. The project, however, is of far wider significance and merits the support of all Americans, both in the tangible way of financial contribution and through influence. Just now the Quetico-Superior Council is facing a financial problem and it is a serious one. It needs contributions and it needs them badly. Ordinarily NATURE MAGAZINE does not open its pages to pleas for funds, but it feels that the importance of this plan is greater than the risk of establishing a precedent.

Every public-spirited American who can do so is urged to acquaint himself with the details of the plan by writing to Ernest C. Oberholtzer, president of the Quetico-Superior Council, 1218 Flour Exchange, Minneapolis, Minnesota.

PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

Easy chair gardening, preferably in front of the fireplace, can well be continued from last month. There is little actual dirt gardening that may be accomplished at this time, but every gardener owes it to himself to do certain things during the weeks when outdoor activity is held up. Dig out the 1931 numbers of all the garden magazines you failed to read carefully. You'll find a wealth of worthwhile information in them. Visit your local library and see if they have not added some new garden books recently. That last book by the late Dr. Ernest H. Wilson, *If I Were to Make a Garden,* just published last summer (Stratford Co., $10.00), is probably the most noteworthy contribution to horticultural literature in recent years. Here's a book many gardeners will wish to own. All of Dr. Wilson's books are of the highest calibre and every real garden library should contain at least one or two.

With the advent of the new year the perennial crop of garden catalogs become available. If you are not on the mailing list for a score or more of these gold mines of garden information, you should get busy at once. Seedsmen, nurseries, plant specialists and dealers in garden equipment will be only too glad to respond if you will just drop them a postcard. You'll find their advertisements in this magazine and many others. Catalogs comprise one of the most important sources of garden information. Every garden fan should maintain a goodly collection. Keep your catalogs where they are easily available and study them industriously. You'll gain from their pages a wealth of garden dope and information you can put to good use in your garden. Only by the study of catalogs can you learn of the new developments in the plant world.

All of us make pilgrimages in the summer to enjoy the gardens of others and glean ideas to better our own, but did you ever think of visiting gardens in midwinter? There is a vast difference in the attractiveness of gardens in the winter. Many of the better ones have made good use of various evergreens and trees and shrubs with interesting bark coloring. Other gardens prove fruitful sources of ideas because in the absence of foliage masses, many architectural details may be observed. Too, you will find they welcome the opportunity to discuss gardens with you at this time. Winter is a sort of a vacation for the true gardener and at this time he does not begrudge you the time as he might in April or May when so many tasks are crying out

(Continued on page 63)

Annuals in a Rock Garden?

When, if ever, should annuals be planted in the rock garden? If you turn to page 63, of the 1932 edition of Dreer's Garden Book, you will find the answer by this acknowledged authority.

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JANUARY WEARS THE GARNET

(Continued from page 53)

that are more or less characteristic of the species. Sometimes they appear in globules or rounded seed-like disseminations scattered like raisins in a bread pudding through a matrix of mica schist or gneiss. Evidently they were named from deposits of the latter type, for the word "garnet" is derived from *granatus,* meaning "seed-like" or "grain-like". Nearly every country in the world contributes them, with German East Africa, Australia, Bohemia, Brazil, Ceylon, India, Uruguay, and the United States supplying the most valuable types.

The largest crystals come from Salida, Colorado, and one of them of which I know weighed 14½ *pounds.* In 1885, workmen, excavating on West 35th Street in New York, uncovered a garnet weighing ten pounds and measuring more than six inches in diameter. These huge stones cannot be used as gem material, however, because they are too coarse in structure, spotted and badly flawed and opaque. The finest rarely exceed the first joint of one's thumb in size, while the average is only slightly larger than a large pea.

The best varieties are worth from $1.50 to $5.00 a carat, which is one-fifth of a metric gram, and on the average bring about $3.50 a carat. These gems are used in all types of jewelry—bar-pins, brooches, festoons, pendants, rings, cuff-links, scarf-pins, beads and neck-chains.

The lowest priced jewelry is the so-called "Bohemian Garnet Jewelry" made by Czecho-Slovakian peasants, and varies from $2.50 to about $40.00. Better class types cost from $15 to $50 for ladies' rings, and $30 to $300 for festoons and necklaces. Of course, jewelry set in platinum or platinum with diamonds or pearls may range in price into the thousands of dollars.

You January-born cannot help but be proud to wear your birthstone. Perhaps through the centuries it has lost the mystical powers the ancients ascribed to it, but it has not given up a single iota of its warm, rich beauty, nor any of its burning glow, which was thought to be a living fire by primitive peoples. It is a stone that always is distinctive, whatever the type of jewelry in which it appears.

. . .

The next article in this series on birthstones will appear in the February issue of NATURE MAGAZINE and will continue throughout the year, constituting a valuable group of twelve articles unique and authentic in treatment.

A Swimming Goat

United States Senators Thomas J. Walsh and Burton K. Wheeler saw an unusual sight when they visited the northeast section of Glacier National Park last summer. As they were standing on the shores of Lake Elizabeth they were greeted by a mountain goat swimming across the quarter-mile stretch of water. Whether the animal came to deliver the mountain goat vote for the two Montana senators or whether he intended to present a petition for more feed at high altitudes must remain unknown, for he evidently got stage fright when reaching the shore and made at once for his inaccessible cliffs.

TREES FOR WASHINGTON

(Continued from page 55)

BOY IS AFTER A TREE RECORD

Maurice McCarthy has planted trees ever since he was big enough to hold them up and tamp earth about the roots

thirteen years old! What an estate he is building for himself! He is a member of the Stockholm Forestry 4-H Club, which is made up of young foresters and which has planted 105,000 trees. He represented his organization on the Eighth Annual Adirondack Forestry Tour.

Then there is Berks County, Pa., the banner county of the country with more than a million trees planted in one gigantic community effort. Jackson County, Mo., has heard the call and Harry F. Truman, presiding judge of the county court, reports three thousand trees for a starter with more to come this year.

Registered on the national honor roll by Mrs. James H. Dorsey of the Maryland Daughters of the American Revolution, a George Washington memorial elm was dedicated by the Anne Arundel Chapter at Rising Sun Inn, Maryland. The dedication was on the historic General's Highway near the Severn Crossroad. This section of the highway is part of the road that Washington traveled on his trip to Annapolis. The D. A. R. has sent the tree-planting message into every chapter and the registrations are just coming in.

In Wisconsin the Federation of Women's Clubs has just voted to plant a forest, appropriately marked, of 640 acres in memory of George Washington. In Ohio the federation is in competition by districts as to which group of clubs will report the most trees for Washington. The same is true in Mississippi and several other states. In Michigan's upper peninsula two new forests have been dedicated to Washington's memory.

In Florida, Gov. Doyle E. Carlton issued a proclamation calling on the people to cooperate with the State Forestry Department and the American Tree Association and named a three-month tree-planting period. The 4-H Clubs in New York State through the Department of Conservation have responded to the plan with thousands of registrations. Gov. Roosevelt has registered one hundred thousand trees as a memorial forest.

The city of Pittsburgh will establish a Washington memorial planting in the Spring of 1932 with 111,500 trees. Dedication exercises were held in the Cook State Forest Park where 10,000 trees have been planted. Boy Scouts will plant 4,000 seedlings along Licking Creek Drive in Juniata County. The State Teachers' College at Bloomsburg, Pa., and several organizations in Columbia County will join in another planting. A plantation has been established in the Penn Forest District in which the letters W M P, Washington Memorial Planting, are outlined with trees on a hillside facing the highway. The letters are 86 feet wide and 60 feet high. The number of trees used in the pattern is 1,732 and this living memorial will be one of the outstanding of the country.

Plans have been put under way in New Jersey for every Boy Scout troop in the state to plant and dedicate trees to the memory of George Washington as part of the bicentennial program. Another big project of nation-wide interest under way in New Jersey is the plan for planting the approach to the famous George Washington bridge with memorial trees. The Bergenfield Garden Club and Mr. W. T. Kessler of the State Forestry Department of Trenton, New Jersey, have taken up plans for landscaping the approach. One of the biggest dedications thus far reported from New Jersey was at the Four-County Young Men's Christian Association Camp Ockanickon, Medford, when 12,000 trees were dedicated to the memory of George Washington.

By arrangement with I. T. Bode, the Extension Forester at Ames, Iowa, the American Tree Association is putting a bicentennial tree-planting campaign through the hundreds of 4-H Clubs in the State of Iowa.

This brief accounting seems, to me, to give an idea of the tremendous appeal of the trees as the memorial of the individual, or the community. In the planting there is citizenship making of the highest type; the type Washington believed the country had; the type in whose service he had grown gray and almost blind. May we have millions more such memorials before the close of the bicentennial year. Then, each succeeding year, let us reaffirm our citizenship near the roots of the trees we planted.

A Surprised Squirrel

Not all squirrels that fall from trees suffer the fate described by the late Dallas Lore Sharp in his recently published article, "The Master Word". A more comical tumble was recently witnessed by Charles L. Craghan, assistant Chief Ranger of Glacier National Park. The squirrel was gathering cones from a lodgepole pine, and tackled an extra large one high on a summit limb. He nibbled it loose, but when its weight was released, the limber branch from which it had hung flipped back, tossing the harvester into the air. Clawing space, with his tail gyrating like the propeller of an autogyro, the surprised creature shot down through the branches of the pine to land beside the cone with a thud. He sat up with an air of consternation, spied his prize lying beside him, and calmly seizing it, bounded away to his cache.

(Continued from page 61)

for attention. You will find the garden clan only too glad to visit and discuss mutual problems.

As you visit other gardens numerous ideas will be found which may be made use of to better your own. Maybe it will be a hedge or fence, a clump of evergreens, red-twigged dogwood or golden willow. Walks, terraces, tea houses, lattice enclosed gardens and many other features add to the attractiveness of the garden even in mid-winter. You should study your own garden at this season when it is stripped of much of its foliage, study its weaknesses, plan where changes may be made. Try to imagine the picture your proposed changes may make, that is, visualize them. Seldom is there a garden that can not be improved.

Outdoor work is very limited at this season. Caterpillar nests should be destroyed. Dead branches may be pruned from trees and shrubs. Growth that is too thick may be thinned. Avoid pruning flowering shrubs and trees that produce their bloom upon wood of the previous season's growth. They should be cut back immediately after flowering. Lilacs, spirea and mock-orange are examples of this class. As you walk around your garden watch out for and replace any mulch that may have blown off; knock heavy snow off evergreens. While the ground is frozen solidly is a good time to haul in any manure or other material that has to be transported over the lawn area. Avoid walking upon the lawn during a period of thaws.

Should your garden soil be heavy, save your coal or coke ashes, sift all coarse material out and use the fine stuff to lighten it. In extremely heavy soil I have spaded in as much as a two-inch layer, greatly to the betterment of the garden. Sand or leaf mold will aid also and peat moss can be used where acid soil will not be a detriment. The home compost heap is invaluable as a source of humus and every garden should maintain one of liberal proportion.

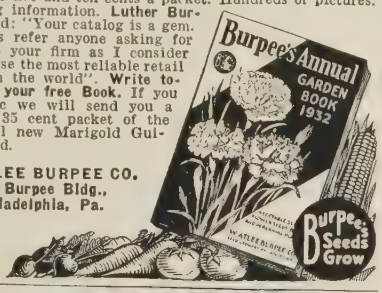
Now is the time to build or buy bird houses as they should be put out well in advance of the arrival of the birds. Aside from the esthetic value of birds in the garden they prove valuable from an economical standpoint. Birds will repay you many fold for any efforts you expend to make them feel at home.

Winter is a good time to make up permanent plant labels for your garden. They may be made of wood or metal or you may purchase them and mark your own varieties on them. I recently saw labeling tags made of material somewhat like celluloid. The surface was green but when scratched the markings stood out in white. This particular gardener was a leading jeweler and used the material for price tags upon his stock. By experiment he discovered the labels were permanent when exposed to the elements. I'm told they are available through some of the seed houses but I have not found them listed. Doubtless they will be popular when generally available as good, reasonably priced labels are scarce.

(Continued on page 65)

Burpee's Seeds Grow

Every year Burpee's Annual Garden Book is awaited with special interest for it is always a source of new and interesting information as well as being the world's greatest garden guide. The 1932 Book is now ready. **It's FREE.** Write for it today. It describes all the best vegetables and flowers including 117 NEW varieties. Best quality seeds as low as five and ten cents a packet. Hundreds of pictures. Planting information. **Luther Burbank** said: "Your catalog is a gem. I always refer anyone asking for seeds to your firm as I consider your house the most reliable retail house in the world". **Write today for your free Book.** If you send 10c we will send you a regular 35 cent packet of the beautiful new Marigold Guinea Gold.



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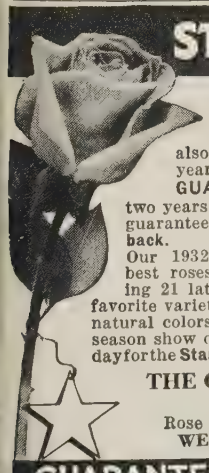

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IN COLOR

In co-operation with Mrs. Katherine B. Tippetts, Chairman of Conservation of Natural Resources of the General Federation of Women's Clubs, the American Nature Association is to publish a special supplement to its April, 1932, issue of Nature Magazine, presenting in color the official Birds of the States.
In addition this will be published in separate form as a sixteen-page folder, printed on a high grade of heavy, coated paper. Eleven of the sixteen pages will be in full color with reproduction of pictures by R. Bruce Horsfall of all of the State Birds thus far selected. The pictures will be accompanied by valuable descriptive text. The remaining five pages will be devoted to an illustrated article by Mrs. Tippetts on the birds and the method of their selection. This feature is felt to be of distinct value in connection with conservation, nature study and other school and organization work.

These booklets will be ready to mail March 20, 1932, and orders should be placed in advance. The cost of the booklets, which will be full magazine size, is governed by the high cost of color printing and the expense of mailing. Orders for less than ten copies must be charged for at fifty cents a copy; for more than ten at twenty-five cents a copy.

AMERICAN NATURE ASSOCIATION, 1214 Sixteenth Street, N. W., Washington, D. C.

Please reserve for me.....copies of "Birds of the States." I enclose $..... These are to be mailed to me March 20, 1932.

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FLORIDA'S GEOLOGICAL PAST

(Continued from page 47)

Florida has a history that should be preserved and cherished.

The sea beaches of Florida are of particular geologic interest in that the sands contain quite a percentage of the commonly called rare-earth minerals. The accounting for the origin of these minerals and their concentration along the shores, has been an interesting problem. These concentrates, principally ilmenite, rutile, zircon and monozite, were for a number of years recovered from the beach sands along the Atlantic Coast about five miles south of Jacksonville Beach. Florida has an extensive coast line and has more ocean beaches than any other state in the Union. Some of these are especially well known, as for instance Daytona Beach, upon which time and again international automobile speed records have been established.

It can be seen that marine deposits have fundamentally formed the State. It is truly one of limestone foundation. In the early writings, however, the true character of the formations underlying the State were not understood for they postulate a coral reef origin. Popular fancy, too, has long held to such a theory and found support in these earlier teachings, but years ago it was shown that the basal limestone of the State was not of coral origin. True it is that corals are found in some of the formations of the State but these are only incidental and make up only a very insignificant part of the whole. The formations of Florida have suffered but little distortion and lie for the most part nearly horizontal as when deposited. The low relief, the highest elevations in the State approximating 325 feet, and the nature of the deposits generally, make the study of the different strata difficult, for there are but few continuous exposures or sections. Through the development of the State generally, however, in the exploitation of its mineral deposits, in the drilling of wells for water and as tests for oil or gas, in drainage enterprises, and all such projects, there is constant and increasing opportunity for studying the interesting problem of the State's geologic history, and it is becoming gradually better known.

Higher Education

The animals that live in Glacier National Park are now taking advantage of the opportunities offered by the Naturalist-Ranger Service. Last summer Dr. W. T. McLaughlin, ranger-naturalist, was surprised to find, when he started one morning on a Nature walk from the lobby doors of Lake McDonald Hotel, that two tame white-tailed deer were among the hikers. He writes in *Nature Notes,* "Sometimes, like too enthusiastic human members, they preceded me, but usually they were well-behaved and politely maintained their position somewhere in the procession. They never interrupted while I was trying to explain or point out something of interest. Their apparent interest in the field trip was climaxed near the end. I had plucked a tuft of squaw hair from a larch branch, discussed it, and later cast it aside on the trail. Thereupon one of the bucks walked slowly up to it, smelled it and slowly ate it with relish."

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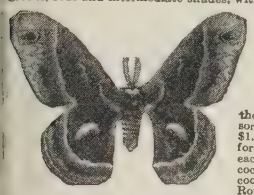

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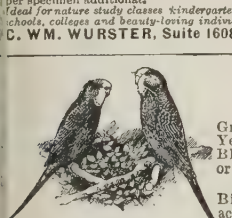

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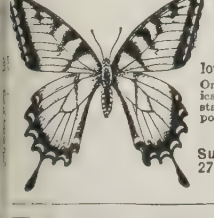

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HOME AND GARDEN

(Continued from page 63)

January is not too early to start seeds of pansies, English daisies, forget-me-nots, *vinca rosea* and snapdragon if you have a small greenhouse. A few weeks from now they may be started in hot beds and later brought on in cold frames. If you want mass effects early in the season an early start is necessary. In lieu of greenhouse or hot bed you can purchase seed and arrange for your local florist to start the plants and bring them along in flats. A flat usually holds around a hundred plants and most florists will make a very reasonable price per flat. In my own city lot garden I have used as many as fifteen flats of various plants from seed.

This is an ideal time to plan your garden for the coming year. Whether the garden is new and in the formative state or well established there are many things about it that require careful planning. Get estimates on construction costs for such things as seats, arbors, pools or fences. Unless your garden is fully outfitted in such things, try to add some one item each year. Plan carefully to place such features where they will fit into your scheme. Every important detail of location, size and proportion should be carefully worked out before work can be started. Put your plans down on paper. You need not be a draughtsman to draw plans for these things. Try to draw them to scale; that means, to proportion the dimension of your plan to the size of the object. A frequently used scale is to allow a half of an inch on the plan represent a foot in the finished object. Thus if you are planning a pool ten feet by fifteen feet your plan would be drawn five inches by seven and a half. If it is to be two feet deep the plan would show one inch. By this method you proportion the parts properly.

Another phase of garden planning has to do with succession of bloom, that is, providing in each section of the garden that early blooming flowers will be followed by something to supply later color. This is not easy for the novice to work out but as one develops garden experience and becomes familiar with more and more plants the problem becomes greatly simplified. With early blooming perennials and bulbs, annuals may be planted to supply later color. Zinnias, marigolds, calendulas and many others prove admirable for this use. Succession plantings naturally lead to planning for color combinations. Here, again, experience is necessary to make much progress and the study of garden color schemes offers a most interesting field.

In making your plans for next year try to add some entirely new thing to your garden. New varieties of shrubs and perennials are being offered each year and a search of the catalogs will reveal many interesting things. If yours is an old established garden, plan to replace some of the less attractive or overgrown specimens with new varieties. An old garden generally contains more or less material that has outgrown its usefulness. No plant has a right to space in your garden when at a slight expense and a little trouble it may be replaced by something very much more worth while.

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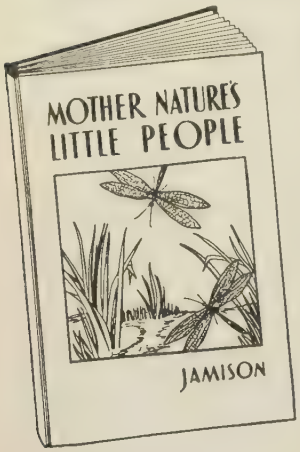

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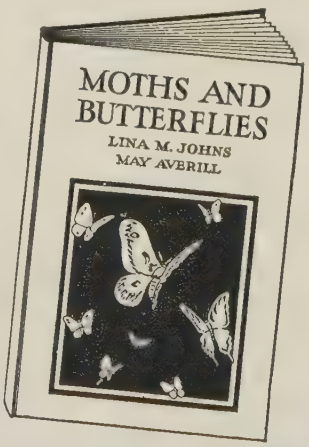
Moths and Butterflies



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TEGWANE, BIRD OF EVIL OMEN

(Continued from page 32)

from the long leaves of the reeds that grew in the river close by.

Days passed, and every day despite incubation and subsequent hatching, the parents brought additional contributions to the nest and heedlessly piled on more and more material. With each passing day the accumulation grew more bizarre. A fragment of filthy, worn out *mutsha* or leather apron, a broken gourd, part of a suit of B.V.D.'s, a pair of socks, pieces of torn paper, and other curious odds and ends.

After the young had hatched, the nest received a most unsavory christening, repeated from day to day. Scraps of rotting meat, a partly-eaten frog, old bones, and then a lizard came to grace the cumbersome structure. As time passed, a faint and nauseating odor seeped into the blind. The nest was filthy with unmentionable dirt, but this odor was different and came from some other source.

It became necessary to investigate the cause of this new discomfort, and not far away, lying partly in the river, was the carcass of a decomposing bushbuck doe. It proved to be a bonanza for the laboring hammerheads, who draped the nest with fragments of skin and bones. As far as could be seen the carrion was not used as food, but seemed to the bewildered birds, torn between two instincts, halfway between food and building material, and in the stress of finding food for growing young, and adding to the bulky nest, the parents compromised as best they could. This habit may have been an isolated case but other nests all had their share of disagreeable materials.

The young birds grew fast. Then, one at a time, they left the nest. The last to go stayed on for several days and seemed afraid to make the start. When we opened it one day he showed fear for the first time, scrambled for the tunnel, flopped and clawed clumsily downward, and then on weak and floppy wings sailed out and away, to disappear around the river bend.

His leaving seemed to close the episode, and but for my carelessness it would have done so. In climbing down the tree below the nest, I slipped and slightly scratched my arm. Having watched the sanitation of the nest, however, I washed my arm, and soon after doused the slight injury with iodine and forgot it. After a few days the arm became inflamed and for some time gave me quite a little pain and trouble. Coincidence or direct result of carelessness, this certainly gave my Zulu friend something to strengthen his convictions.

Three or four weeks later I went walking on the hills a mile or two away from base. The sun was setting, and across the red horizon three dark shapes were winging towards a nearby ridge. They settled on the open ground and silently commenced to feed. They ran or flapped along a foot or so above the ground, in awkward chase of food. Their prey consisted of the winged forms of termites, and not the food one might expect in birds so fond of river banks and marshes. They must have been a family party, but which was parent and which the young could only be guessed at. The new dynasty of this bird of evil omen had begun.

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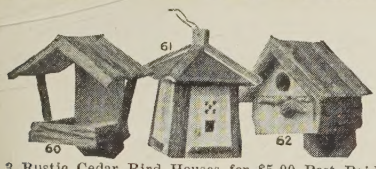

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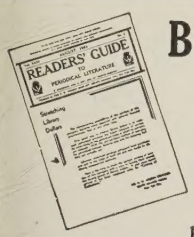

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Intelligent Fish

How fast can fish learn? And how much? If the experience of Edwy E. Benedict of Waterbury, Connecticut, with a school he trained to come for food at a certain hour each day indicates the average piscatorial intelligence, these creatures are much more clever than is usually supposed. The stream in which this school lived was bordered on one side by a shop in which Mr. Benedict worked, and on the other by a railway. At 12:00 noon each day a freight passed over the tracks; fifteen minutes later, a passenger train followed. Shortly after this went by, Mr. Benedict used to throw crumbs into the stream, and the fish would gather to feast on them. He soon noticed that although not a fish could be seen when the freight rumbled through, as soon as the second train had passed the creatures would gather on the shop side of the river as if signalled to come for their meal. Every day it became more clear that they gathered immediately after the noise of the passenger had died away. To make his test complete, Mr. Benedict stopped feeding the fish for several days. They stopped congregating almost at once. When he reorganized the bread-line, however, they again used the sounds of the 12:15 train as a signal that "dinner was being served."

A Friendly Coyote

A coyote that came within twenty-five feet of his cabin and showed little or no fear of either humans or dogs is described by Dorr G. Yeager in Rocky Mountain National Park *Nature Notes*. Naturalist-Ranger Yeager was attracted to the animal by the vigorous barking of his Airedale terrier. The coyote was a beautiful creature, with silky gray coat and creamy underparts. When Mr. Yeager appeared, he slowly moved away, stopping, however, when he stopped, and keeping only about twenty-five feet between them. After the game of tag had ended and Mr. Yeager had returned to the house, the animal still remained in the vicinity, evidently hunting for mice or ground squirrels. He seemed to have at first an amused interest in the frantic terrier, but after a while found him slightly boring. The protection the animal receives in the National Park is evidently responsible for such indifference in the presence of man.

Skunk Holds Off Bear

Yosemite skunk, it seems, run the ranch, and, when they feel like it, the bears off the ranch, figuratively speaking. During June a half-grown striped fellow sent two bear cubs up a tree, caused the mother to retreat, and foraged for food, all at the same time. The skunk, writes Enid Michael in Yosemite *Nature Notes,* was calmly hunting for food when two bear cubs became interested in it. Mother bear, careful of her children's associates, sent them scurrying up a pine away from the cat; then she tried to route the skunk in a different direction. Failing in this, she stamped her feet and snorted right in his face, but soon backed away as if disliking the general atmosphere. Finally, she hurried up the tree herself to sniff her cubs while the young member of the civet cat tribe continued his meal.

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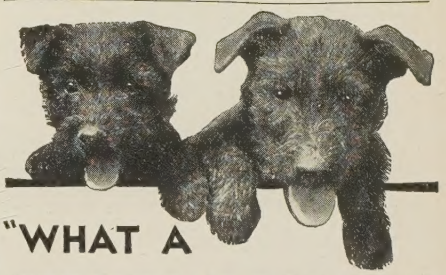

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INDEX TO ADVERTISERS IN JANUARY ISSUE

BINOCULARS

DuMaurier Co. . . . 7
Loring, J. A. . . . 7

BIRD HOUSES

Califf, Gladstone . . . 67
Crescent Co. . . . 67
Kelly, Lewis P. . . . 67
Packard, Winthrop . . . 67

BOOKS

Bird and Animal Paintings . . . 2nd Cover
Forests and Mankind . . . 68
Forest Facts for Schools . . . 68
Garden Digest . . . 61
Nature Almanac . . . 1
Nature Binder . . . 3rd Cover
Newspaper Institute . . . 6
Owen, F. A. . . . 66
Plymouth Rock Squab Co. . . . 67
Press Institute . . . 65
Wilson, H. W. Co. . . . 67

EDUCATIONAL

American Landscape School . . . 7
American School of Photography . . . 7
North American Institute . . . 7
Rosicrucian Brotherhood . . . 3
University of Chicago . . . 7

GARDEN & ACCESSORIES

Brooks, C. J. . . . 61
Burpee, W. Atlee Co. . . . 63
Conard-Pyle Co. . . . 63
Dreer, Henry A. . . . 61
Edwards, J. B. . . . 65
Gillet, H. M. . . . 61
Gillett's Fern and Flower Farm . Back Cover
Green's Nursery Co. . . . 65
Johnson Water Gardens . . . 63
Kunderd, A. E. . . . 65
Maule, Wm. Henry . . . 61
National Home Planting Bureau . . . 61
Salbach, Carl . . . 63
Shumway, R. H. . . . 61
Storrs & Harrison Co. . . . 63
Sutton's Seeds . . . 63
Vaughan's Seed Store . . . 61
Vick, James & Son . . . 61
Woodlawn Nurseries . . . 63

GIFTS

Bastian Brothers Co. . . . 7
Gift and Photo Shop . . . 7
Kollmorgen Optical Co. . . . 65
Metal Arts Co. . . . 7

HOTELS

Admiral Hotel . . . 66
Bismarck Hotel . . . 64
Herald Square Hotel . . . 7

MISCELLANEOUS

Bird and Game Farm . . . 65
Birds of the States . . . 64
Claff, Hugo . . . 65
Comfitape Laboratory . . . 7
Denison & Co., T. S. . . . 7
Tax Sales Service . . . 65
Wild Flower Preservation Society . . . 7
Wurster, C. Wm. . . . 65

PETS AND THEIR CARE

Austin Workshops . . . 67
Battle Creek Dog Food Co. . . . 67
Chappel Brothers . . . 67
Comrade Farm Kennels . . . 67

PHOTOGRAPHIC

Willoughbys . . . 3

SPORTING GOODS

Northland Ski Co. . . . 7

TAXIDERMY

Jonas Brothers . . . 67

TRAVEL

Cunard S. S. Line . . . 3
Nature Cruise . . . 5

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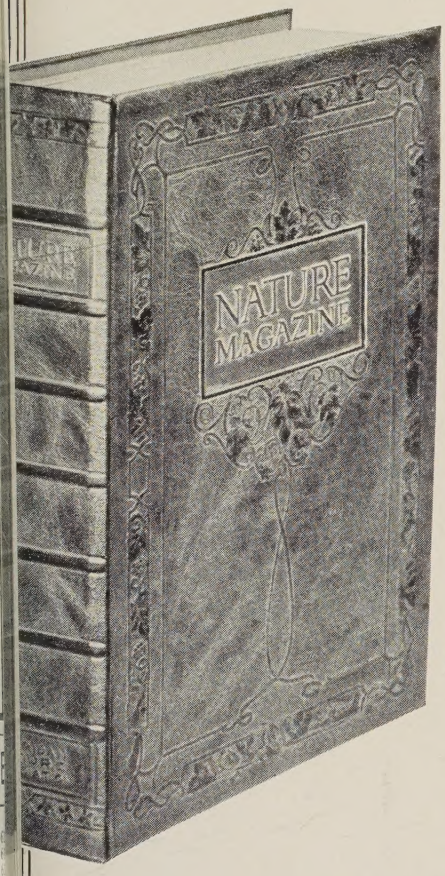

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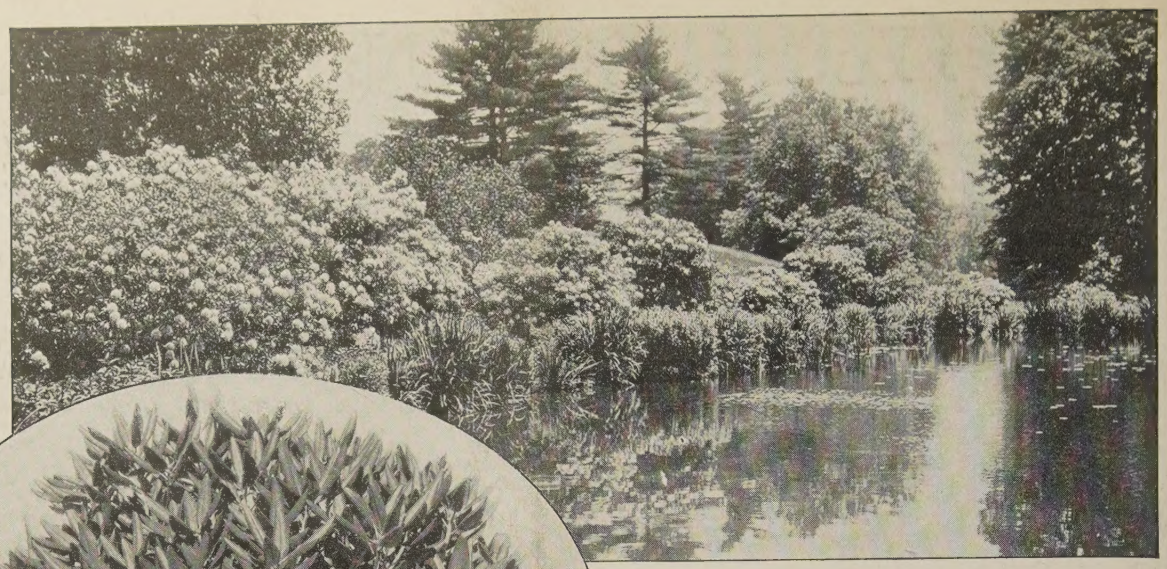

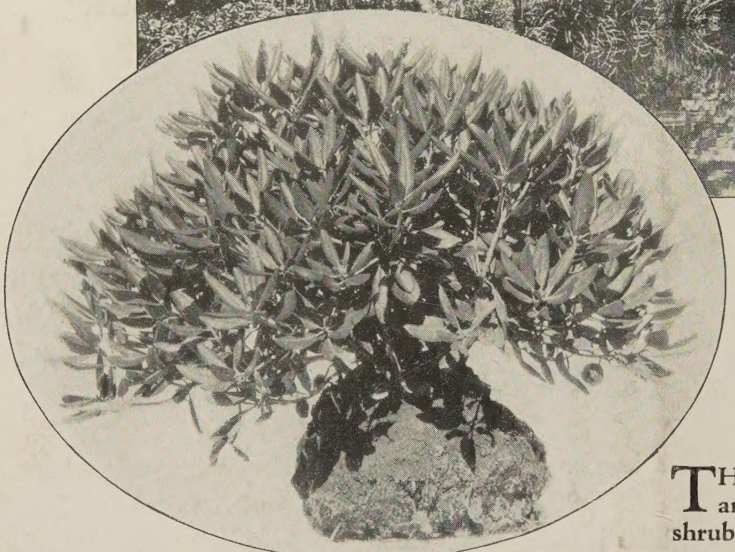

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